AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

AIR CONDITIONING SECTION
PAGE 81

JANUARY
1940

ESTABLISHED
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DIRECTORY
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NUMBER

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LAMNECK

Series 700 System Prefabricated Duct and Fittings

Visit the **LAMNECK** *Exhibit*

in Cleveland

We'll be at Booths 551-555 at the International Heating and Ventilating Exposition.

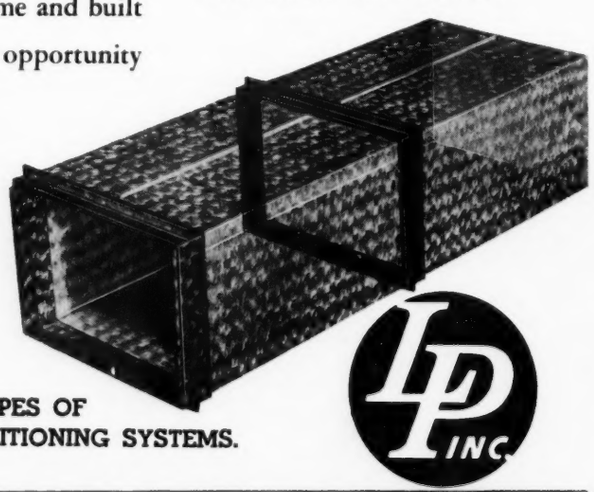
The Greatest Single Forward Step in QUALITY, LOW COST Air Conditioning Ducts and Fittings

The Lamneck Series 700 System of Prefabricated Ducts and Fittings is today's outstanding contribution to bigger dependable dealer profits! New ease and speed of installation cuts man-hour time on every job! Even estimating time is drastically lowered because you know to a penny the cost of material—the cost of labor . . . you know ahead of time what your profit will be because the Lamneck Series 700 System is perfected to a point which overcomes installation delays. Designed to save YOUR time and built to highest quality standards, Lamneck brings you a rare opportunity to boost volume and earn extra profits on every job!

Write for Name of Our Nearest Distributor

Let Us Show You These Outstanding New Features

NEW TYPE CONNECTION FOR DUCT AND STACK



SPECIFY LAMNECK

PREFABRICATED DUCT AND FITTINGS FOR ALL TYPES OF RESIDENTIAL WARM AIR HEATING AND AIR CONDITIONING SYSTEMS.

LP INC.

LAMNECK PRODUCTS, Inc.

Dublin Ave., Columbus, Ohio

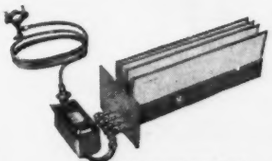
MAR 7 - 1941
Publishers binder

MAID-O'-MIST

AUTOMATIC HUMIDIFIERS

"CONVECTOR" HUMIDIFIER for Warm Air Furnaces

Made to fit the advanced methods of forced or gravity circulation and to provide ample humidity. Copper Troughs, spaced 1" apart, Metal Edged Evaporators, 6" high, complete as shown. Can be furnished in a selection of sizes to fill each individual requirement.



No. 184—"CONVECTOR" HUMIDIFIER for Warm Air Furnaces

Prices include 6 feet of ¼" copper tubing and saddle valve. The above ratings are based on a temperature of 180° in plenum chamber with one air change per hour. Practice has proved that a relative humidity of 30% in near zero weather is sufficient for all practical purposes.

Sizes, Capacities and Prices

No.	Length of Trough Inches	No. of Troughs	Lbs. of Water Evaporated	List Price
182	17½	2	17	$13.75
184	17½	4	35	17.25
242	23½	2	23	14.50
244	23½	4	46	18.50
302	29½	2	29	15.50
304	29½	4	58	19.25
362	34	2	35	16.25
364	34	4	70	20.00

No. 9 "ZEPHYR" HUMIDIFIER

The "ZEPHYR" HUMIDIFIER has a pan 36"x4" stamped in one piece from 22 Ga. genuine sheet copper-bronze metal. Pan equipped with patented hinged wings 2½"x32" to deflect air over the water surface to give maximum efficiency.

No. 9—"ZEPHYR" AUTOMATIC HUMIDIFIER for Warm Air Furnaces

	List
No. —36" Pan	$15.50
No. 926—26" Pan	15.00
No. 85CH less wings, 36" Pan	13.20
No. 86CH less wings, 26" Pan	12.75

No. 58-Z "MAID-O'-MIST" HUMIDIFIER

"MAID-O'-MIST" HUMIDIFIER is of the same design and material as the No. 9. It is 36" long x 3⅝" wide and has a heating area of 350 sq. in. No. 5826-Z is 26" in length. Humidifier fed by a No. 59 Water Feeder which is located away from heat of furnace and housed in an N.P. Brass reservoir 2¼"x2¼"x6" long.

No. 58-Z—"MAID-O'-MIST" AUTOMATIC HUMIDIFIER for Warm Air Furnaces

No. 58-Z—36"	List $14.75
No. 5826-Z—26"	List 14.25
No. 58-H—36", Without Wings	List 12.50
No. 5826-H—26", Without Wings	List 12.25

No. 20-H "DRIP" HUMIDIFIER

Is supplied with water by Hand Controlled N.P. Drip Water Feeder with sight feed. Bronze Pan, Hood Plates. Complete as shown.

No. 20-H—36" List $9.00
No. 26-H—26" List 8.75

No. 20-H—"DRIP" HUMIDIFIER for Warm Air Furnaces

Also many other styles and types which provide long price range. Note: All Warm Air Humidifier prices include 6 ft. of ¼" Copper Tubing and Saddle Valve.

No. D5182—"CONVECTOR" HUMIDIFIER for Space Heaters

No. D5182 "CONVECTOR" HUMIDIFIER

Made in four regular types with one or two troughs made of copper. Each trough is 17½" in length and is equipped with metal-edged evaporator. D-5181 and S-181 are each equipped with one trough; D-5182 and S-182 are each equipped with two troughs. D type is supplied by a hand controlled sight drip feeder. S type is supplied by a No. 59 Automatic Water Boy Feeder.

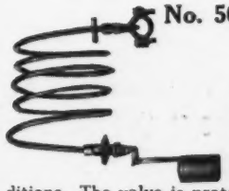
No. D5181	List $7.00	No. D5182	List $10.00
No. S181	List 9.50	No. S182	List 13.75

Also Humidifiers for hot water, steam, vapor and vacuum heating systems.

VISIT OUR BOOTH
No. 524
International Heating Exposition
Cleveland, Jan. 22-26

AUTOMATIC WATER LINE CONTROL VALVES

No. 50-F Water Boy Midget Feeder



For bucket or pan type humidifier, etc. The No. 50 series of Water Boy Midget ball cocks are designed to fit the requirements for humidifying units, etc., in air conditioning equipment at a price range to meet various requirements and conditions. The valve is protected by a 1⅛" diameter Monel metal screen filter. All bearings are Monel metal, copper float N.P. Valve seat made of Nickel Silver. Valve stem has an incased heat and oil resisting Neoprene seat. Equipped with union coupling for ¼" O.D. copper tubing.

No. 50-F—With Saddle Valve and 6 ft. ¼" O.D. Copper Tubing.....List $4.00
No. 50 —Valve only, less fittings.....List 2.50

No. 59F WATER BOY FEED VALVE With Adjustable Water Line

No. 59 Water Boy is built of Brass, Copper, Monel and Nickel Silver. A No. 50-L Water Boy is housed in a nickel-plated brass reservoir 2¼" x 2¼" x 6" long provided with removable cover complete as shown with 6 ft. ¼" O.D. Copper tubing. Designed to prevent back siphonage.

No. 59-F—Water Boy, complete as shown...List $6.50
No. 59 —Water Boy only, less fittings.....List 5.00

No. 85 Water Boy Feeder

Small, attractive and positive acting. The shells are drawn from sheet brass and nickel-plated. To avoid corrosion, valve seat is raised and is made of Nickel Silver, and the valve pin is fitted with a heat-resisting incased Neoprene washer. All operating levers and bearing pins are of Monel Metal. Float is copper Nickel Plated. The upper shell is equipped with a 100 mesh Monel Metal Filter, 1¾" dia., removable for cleaning. Water Boy Feeder is 2¼" x 6½" in size. Designed to prevent back siphonage. Made in six different styles of inlets and outlets.

No. 85 .....List $7.50

No. 8 QUICK HOOK-UP SADDLE VALVE

Designed to fit ½" and ¾" water pipe. Simply drill a ¼" hole in pipe. Outlet is provided with union coupling for ¼" O.D. Copper tubing.

No. 8 .....List $1.00

No. 4 DUPLEX FILTER STRAINER

Designed and recommended to protect Water Boy Feeders, solenoid valves, spray nozzles, etc., from pipe scales on old installations. Has ¼" I.P. connection. Twin Monel Metal Screens.

No. 4—Brass shells and nut, N.P. finish, 2¼" x 3½" .....List $2.50
No. 44—Brass shells and nut, N.P. finish, 2¼" x 5½" .....List 2.50
No. 24—Brass Housing with ¼" O.D. tubing unions, 1½" x 2¼" .....List 1.10

Send for Complete Specifications and Prices Including Liberal Discounts
SEND FOR FREE CATALOG A-1

MAID-O'-MIST Inc.
AUTOMATIC HUMIDIFIERS
180 N. WACKER DRIVE CHICAGO, ILL.

SELL HUMIDITY

AMERICAN ARTISAN

WITH WHICH ARE MERGED

FURNACES AND SHEET METALS

AND

Warm-Air Heating

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

J. D. Wilder, Editor — A. A. Kennedy, Assistant Editor

Vol. 109, No. 1 — January, 1940 — Founded 1880

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In This Issue

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WITH interest in city ordinances and licensing codes gaining impetus month by month, the report of the experience in Minneapolis on page 161 should be vital to many contractors and associations. Howard Betts, author, has been intimately associated with the code since its inception. His observations furnish a complete answer to all the questions he has been asked since the Minneapolis code was publicized.

•

Also interesting, we hope, is the Survey of Price per Opening in 101 Cities on page 166. This survey, as we point out, is not an attempt to prove or disprove the value of Price per Opening—but is a report of what is going on all over the country. The editors will be glad to answer questions or refer questions to cooperating contractors.

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One of the most unusual merchandising articles published in years appears on page 83. In this article E. L. Boyd, of the Boyd-Cooper company, explains what a Detroit home buyer gets for an average of $335 in a winter air conditioning system. Contrary to widespread opinion, Detroit home owners seem to be getting a very good heating system. How this system can be installed for $335 makes a story well worth study.

•

In the Sheet Metal Section there are three articles on fabricating of particular importance. If you spray paint, the article on page 138 summarizes years of experience with spray painting equipment to reduce painting costs. The article on the manufacture of sheet metal cabinets on page 142 is a first-hand insight to the methods of factory control used by one of our most successful fabricators. And the ingenuity of a sheet metal fabricator in adapting his equipment and developing special equipment is clearly shown in the article on page 149.

Member of Audit Bureau of Circulations — Member Associated Business Papers, Inc.

Published monthly by Keeney Publishing Company, 6 North Michigan Ave., Chicago, Ill., U. S. A. Branch Offices—In New York, Room 1734, Grand Central Terminal Building, Murray Hill 9-8293; In Cleveland, 2128 Rossmoor Road, Cleveland Heights, Yellowstone 1540; In Los Angeles, J. H. Tinkham, 1406 S. Grand Ave., Richmond 6191. Copyright 1940 by Keeney Publishing Company—F. P. Keeney, President; W. J. Osborn, Vice President; R. Payne Wettstein, Secretary; Chas. E. Price, Treasurer. Advertising staff: Wallace J. Osborn, R. Payne Wettstein, Robert A. Jack, J. H. Tinkham, L. A. Doyle.

Yearly Subscription Price—U. S. and possessions, Canada, Mexico, South America, Central America, $2.00; Foreign, $4.00. Single copies, U. S. and possessions, $.25. Back numbers, $.50. January, 1939, Directory issue, $1.00 per copy. Entered as second-class matter, July 29, 1932, at the post office at Chicago, Illinois, under the act of March 3, 1879.

More than 8,000 copies of this issue are being distributed

Some Catch!

BY TIM SHEARS

ONE of the wife's buddies was givin' her husband the needle about wasting his time fishing. "All *you* ever bring home," she sneers, "is an empty pail or fish that's all bones. Why don't you catch something we can *eat?*"

Her old man mumbles something an' ambles off to his boat. But he don't have no more luck than before...plenty of bites but nary a fish. So on his way home he calls at the fish market. "Gimme a couple of good sized flounders," he orders, "an' don't wrap 'em up...just *throw* 'em to me!"

When he gets home his wife starts her usual grousing. Then she spies the fish. Does the old man throw out his chest! "Well, Mabel," he chortles, "Whadda you think of these? Nothin' but nibbles all day. Then just as I was coming home *I caught a couple of flounder!*"

A good catch for a sheet metal man is an order for equipment for one of these shore plants that pack crab, lobster, oysters, sole, herring, halibut, cod or what have you.

The shore plants is where they clean, scale, shell and pack sea food. An' that calls for plenty of sheet metal equipment. Skimmers, strainers, sinks, washing tanks, packing tables an' lots of other items make swell sheet metal jobs. Easy to make...an' they bring in real dough when made in Monel. An' Monel is just what sea-food packers want. I'll tell you why:

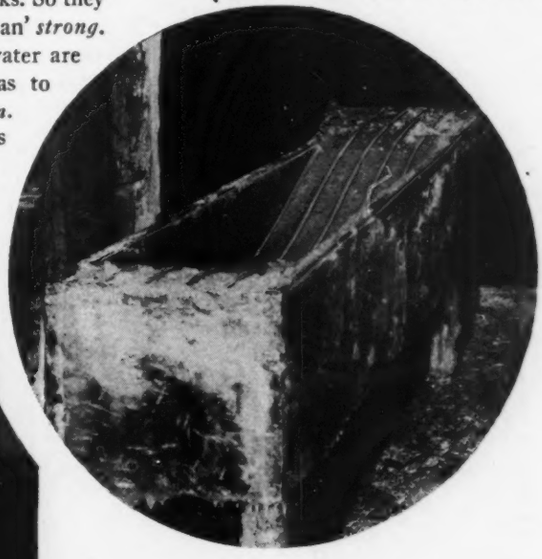
They dump barrels of crabs an' oysters on tables or into tanks. So they need equipment that's good an' *strong.* An' where brine an' salt water are slopping around, metal has to *stand up against corrosion.* On top of that, sea food has to be kept pure. That means equipment that's *easy to clean.* Add it all up an' you get one answer...Monel.

In case you want more dope on the kind of equipment these shore plants use, just drop me a line. I'll be glad to give you the low-down.

An' remember, *when I tell you there's a pile of these jobs to be had if you only go after them, it's no fish story.*

TIM SHEARS

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street New York, N. Y.



These two jobs are a cinch for any sheet metal man. Crab picking table at left and glazing tank above are both made of wood. All you do is line them with Monel and pull in your profit. You'll find lots of other easy jobs, too, in any shore plant.

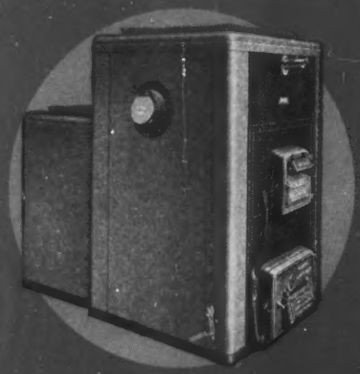
• • •

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

MONCRIEF *Furnaces*

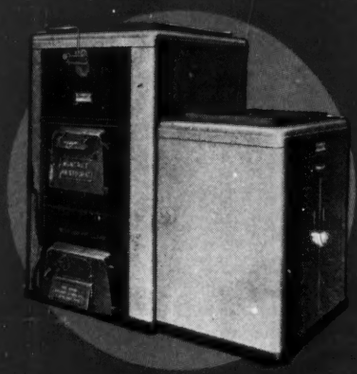
and Winter Air Conditioners

AN ALL-STAR TEAM OF TOPNOTCH PERFORMERS

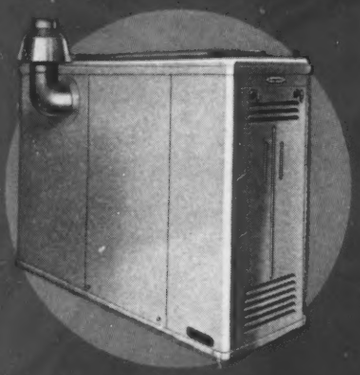


★ "Aristocrat" Coal Fired (Cast) Winter Air Conditioner

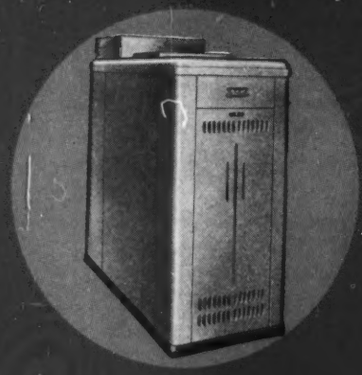
★ "Aristocrat" Oil Fired Winter Air Conditioner



★ "Aristocrat" Coal Fired (Steel) Winter Air Conditioner



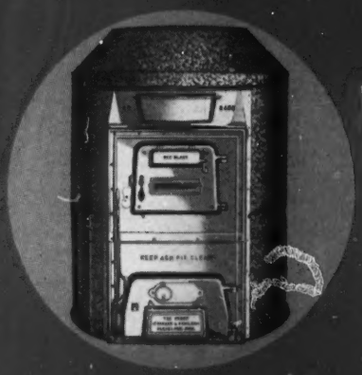
★ "Aristocrat" Gas-Fired Winter Air Conditioner



★ "Special" Oil Fired Winter Air Conditioner

★ "BAC" Gas Fired Winter Air Conditioner

★ Series "C" Cast Furnace



★ Series "S" Steel Furnace

Moncrief Winter Air Conditioners are made in specialized types for coal, oil and gas. All are enclosed in beautifully finished cabinets, adapted to the modern finished basement. Their great economy and marvelously convenient automatic operation make a strong appeal to the home owner of today.

MONCRIEF MAKES A COMPLETE LINE OF QUALITY PIPE AND FITTINGS FOR GRAVITY AND AIR CONDITIONING INSTALLATIONS

MONCRIEF'S *Bright* *New Star for* 1940

THE BIG PROFIT NEW$ OF THE YEAR

Dealers, here is something you can really go to town with . . .

• De Luxe Long Life, the newest addition to the extensive Moncrief Line, gives you more to offer the homeowner and builder than any other unit on the market today.

It has *Everything* to sell the 1940 market . . . the style . . . the special features . . . the equipment . . . the right price for the homeowner . . . and *the Right Profit for You.*

It enables you to make the profit on a furnace that you wanted and deserved but could not realize because you could not give the homeowner something different, something better for his money.

The De Luxe Long Life gives you something to sell besides price. It has all the things the 1940 homeowner is looking for—cast or steel heating units, electric controls, automatic humidifier, square casing beautifully finished in two-tone green enamel, all with a twenty-year guarantee assuring long-time durability.

De Luxe Long Life is geared to today's moods and demands. We have built and packaged it so you can handle it easily and make quick sales and bigger profits.

Moncrief Long Life
Backed by 20-year Guarantee. Cast or steel heating unit. Standard cased. Equipped with automatic damper control and Thermo-Drip humidifier.

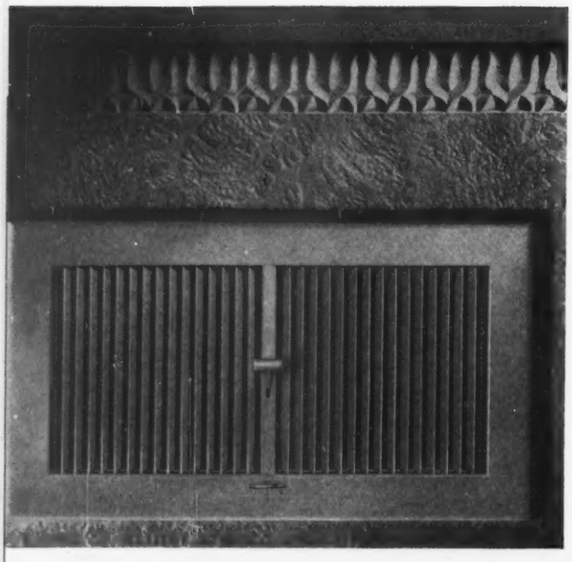
We can't begin to tell you about it here. Write, wire or phone and get the big news in detail. Be the first in your community to realize on the great opportunities this new unit gives you.

Rely on MONCRIEF'S
ENGINEERING SERVICE to help
you plan and lay out plans

The **HENRY FURNACE & FOUNDRY CO.**
3473 EAST 49TH STREET • CLEVELAND, OHIO

To Both Problems:

H&C Supplies the Perfect Answer!



FOR BEST POSSIBLE RESULTS

No. 86 Design

WITH TURNING BLADE VALVE

Not an expensive Register

When perfect air distribution is the objective, there is no other register that compares with the H & C No. 86—for no other register has the TURNING BLADE VALVE. As will be seen in the diagrams below, this valve turns every bit of the air smoothly and with uniform velocity through all portions of the register face, thus eliminating turbulence, avoiding noise, and greatly reducing resistance. 18 different adjustments—instantly made on the job—assure perfect control of the air as desired. For the best possible results, No. 86 is *the* register, but No. 86 is not an expensive register, *because no premium is charged for the turning blade valve.* No. 86 merely costs the same as *any* adjustable bar register.

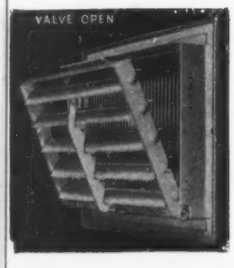


FIGURE 1

Position of shutters with regulator set for 20° upward deflection.

FIGURE 2

Position of shutters with regulator set for 20° downward deflection.

FIGURE 3

Position of shutters with regulator set for horizontal air flow.

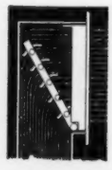


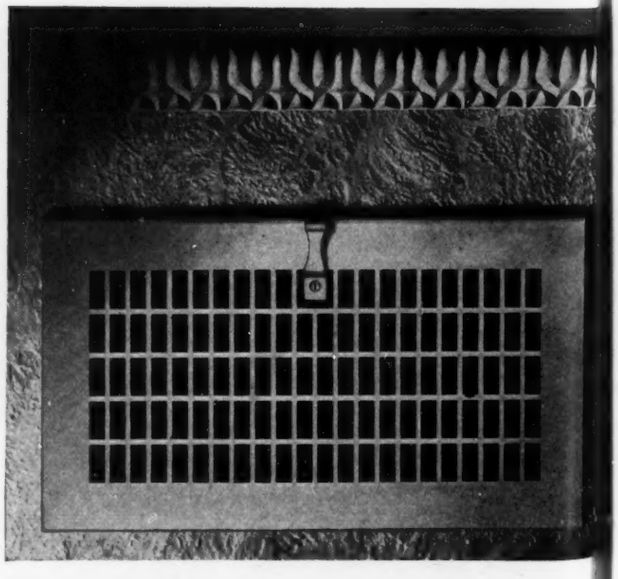
FIGURE 4

Air flow with conventional register.

FOR UTMOST ECONOMY

No. 69 Design

A QUALITY item in every detail, yet priced with the lowest, No. 69 enables you to compete on any job and still furnish a register that will be a credit to you. No. 69 is attractive in appearance, affords excellent concealment of duct with ample free area, and is furnished with sponge rubber gasket to insure streak-proof installation. No. 69 is an outstanding value and unquestionably the best bet in registers in the "Economy" price group.



HART & COOLEY MANUFACTURING CO.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulleys

FACTORY AND ENGINEERING SALES OFFICE:

HOLLAND H&C MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

$39.95

COMPLETE WITH BLOWER SWITCH

Furblo
No. 7102

1300 CFM — This is guaranteed capacity at 1/8-inch static pressure of the regular No. 10 FURBLO included in this complete No. 7102 Package Unit.

1/4 H. P. Motor — Long hour duty type, 110-V., 60 cycle, 1 phase, A. C., meets all power company requirements. Automatic overload cutout. Has 50% more POWER than 1/6 hp motor usually supplied with blower of this size.

720 SQ. IN. — Filter. One 24"x30" throw away type fibre filter. Can be cleaned several times by tamping. Note: 2 extra replacement filters free if you send cash with order.

Cabinet dimensions 25"x31"x27" high. Access door in rear. Single speed drive. Blower wheel is the exclusive and patented FURBLO Electric-Arc-Welded construction.

Why This LOW Price?

—To help you prove to your own complete satisfaction that mid-winter conversion jobs are PROFITABLE for YOU, we are offering a strictly limited number of these units in this size and type only and at this unusually low price.

2 Extra Replacement Filters If You Send Cash With Order FREE

➡ Mail the Order NOW ⬅

Furblo Co., Hermansville, Michigan

Ship at once No. 7102 FURBLO Package Units at $39.95 each, f.o.b. Hermansville, Mich., with the distinct understanding that if I am not completely satisfied with them, I can return them within one week for full credit and refund of all transportation charges.

30-DAY TERMS — Invoice through my jobber (whose name and address are given below) on regular 30-day terms.

CASH WITH ORDER — I enclose check and as a special cash-with-order premium you are to include in the shipment 2 EXTRA replacement filters FREE OF CHARGE.

My jobber's name and address are [Please give this information whether you send cash or not]:

. . . . . .

. . . . . .

My name and address are:

. . . . . .

. . . . . .

A.A. Jan. 40

Ask any user why he saves with Parker-Kalon Sheet Metal Screws and he will give you half a dozen good reasons. But all can be boiled down to just one fact —*only the genuine gives genuine fastening economy.* That's why in more than 40,000 sheet metal shops, none but Parker-Kalon Screws go on the job.

Parker-Kalon Screws are accurate to size and are threaded right up to the head . . . which means *easy* driving and secure fastenings every time. Because heads don't break off, because threads don't strip, Parker-Kalon Screws end the trouble and expense of replacements. Jobs are completed in less time, with less effort, at less cost. Aren't those the savings *you* want?

You can be sure of genuine fastening economy and security by ordering sheet metal screws by this name . . . *Parker-Kalon.*

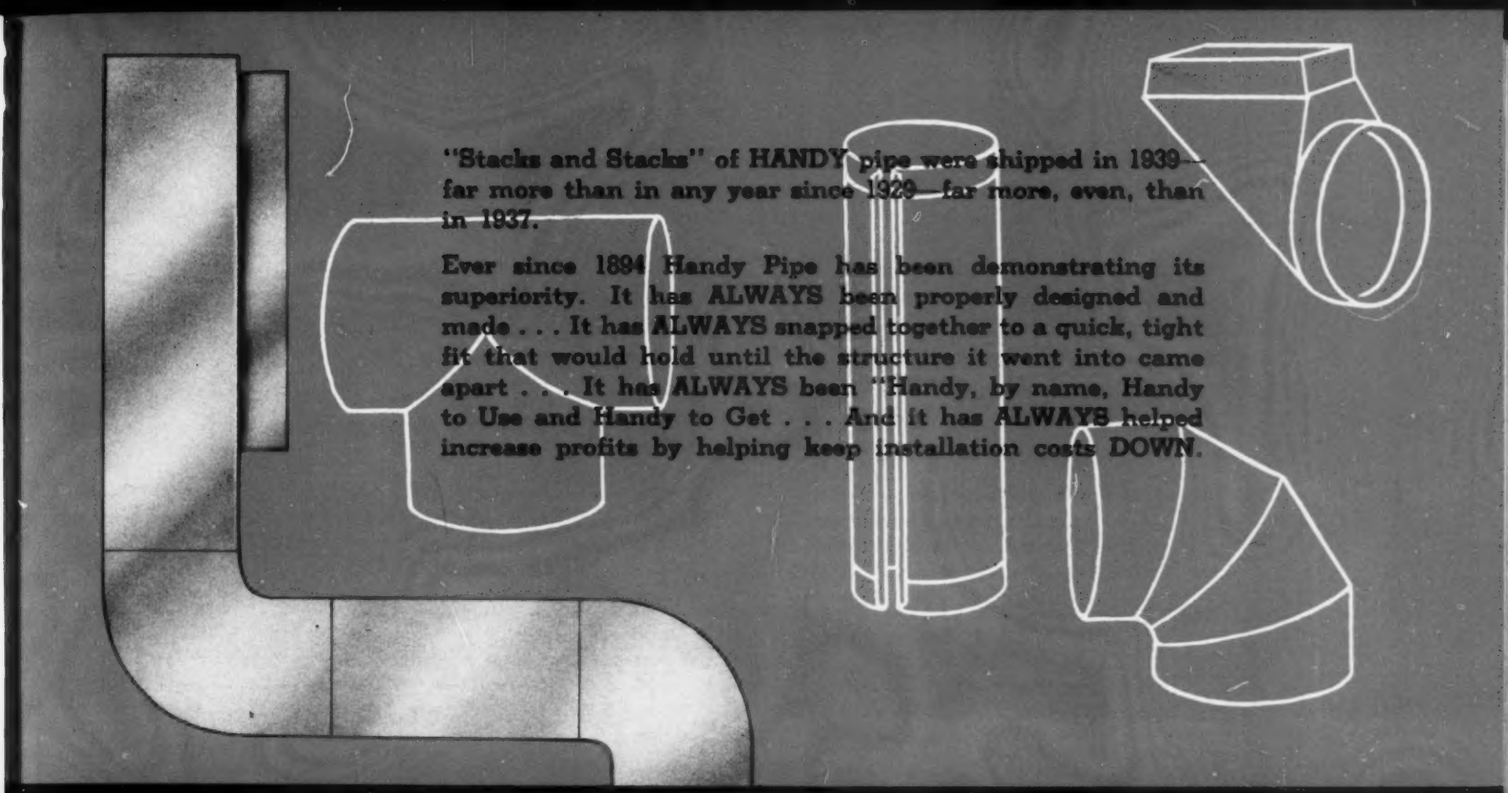
PARKER-KALON CORP., 200 Varick Street, New York, N. Y.

4 REASONS WHY YOU CAN DEPEND ON PARKER-KALON SHEET METAL SCREWS

1. **UNEXCELLED LABORATORY FACILITIES** . . . the Parker-Kalon Laboratory which controls and maintains the high standard of quality for which Parker-Kalon Screws are so widely recognized, represents an investment of over $250,000.
2. **SPECIALIZED PRODUCTION EQUIPMENT** . . . is required to produce Parker-Kalon Self-tapping Screws and to maintain their uniformly high quality. The Parker-Kalon plant is famed as the most up-to-the-minute in the industry.
3. **FREE ENGINEERING SERVICE** . . . to help designers and production men obtain better fastenings at lower cost. Available throughout the country, Parker-Kalon Assembly Engineers render free service to both users and prospective users of Parker-Kalon Self-tapping Screws.
4. **AVAILABLE EVERYWHERE** . . . no matter where your plant is located there is a reputable supply house distributing Parker-Kalon Screws . . . assuring you a dependable source of supply.

PARKER-KALON
Sheet Metal Screws

SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS



"Stacks and Stacks" of HANDY pipe were shipped in 1939—far more than in any year since 1929—far more, even, than in 1937.

Ever since 1894 Handy Pipe has been demonstrating its superiority. It has ALWAYS been properly designed and made . . . It has ALWAYS snapped together to a quick, tight fit that would hold until the structure it went into came apart . . . It has ALWAYS been "Handy, by name, Handy to Use and Handy to Get . . . And it has ALWAYS helped increase profits by helping keep installation costs DOWN.

Use HANDY PIPE For PROFIT

F. MEYER & BRO. CO.
PEORIA, ILLINOIS

F. MEYER & BRO. CO.
PEORIA, ILLINOIS

Please send your catalog No. 52 with latest discount sheet.

Name_____

Address_____

It's YOUR move

Your success depends on two things: your merchandise and your methods. We will supply the merchandise—a complete line of heating and air conditioning equipment with a name that, since 1866, has stood for SUPREME QUALITY.

We pioneered the development of the STEEL warm-air furnace (and the trend to steel furnace preference during the past decade proves that we were on the "right track") and we have always been in the forefront of every warm-air-heating and air-conditioning advancement. No name in the heating industry stands higher to-day than WEIR and MEYER.

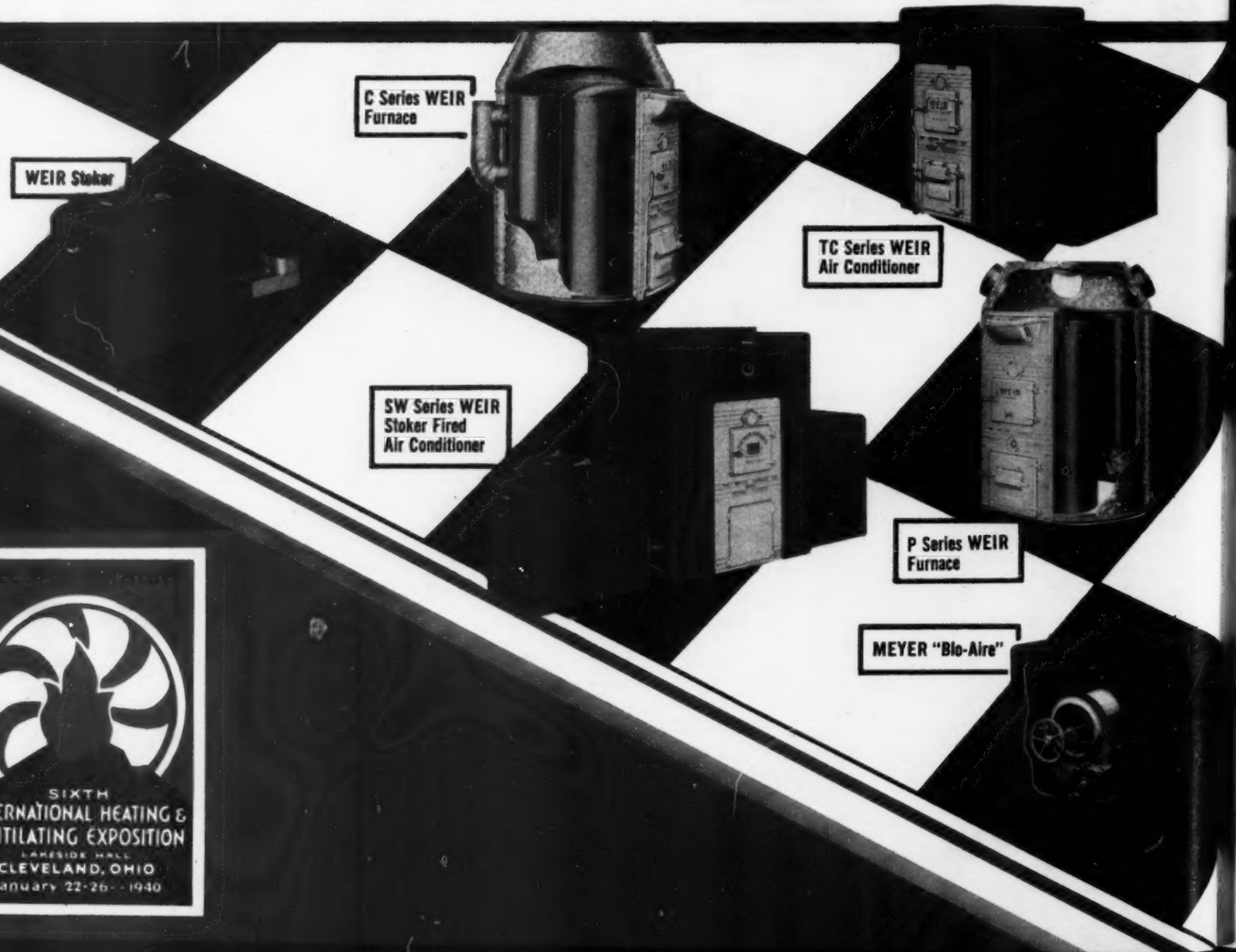
Our Dealers are PROUD of their connection . . . Many have built their reputations on our foundation . . . They enjoy the CONFIDENCE that is mutually felt . . . They appreciate the security of actually *exclusive* territories . . . They find our sales-helps and financing plan really HELP and that our engineering methods and service put them in a class by themselves . . . And they "stick" (continuous Dealerships of more than 25 years standing are no rarity.)

All of the foregoing is OUR contribution. NOW it's YOUR move. If you really want 1940 to mark the beginning of a connection of no regrets . . . If you want to step out with a line of equipment by which others are measured . . . If you are determined to hitch up your own methods and workmanship with a line of merchandise to MAKE YOU or KEEP YOU the outstanding Warm Air Heating and Air Conditioning Contractor of your community . . . Then sign and mail the coupon. It's YOUR Move!

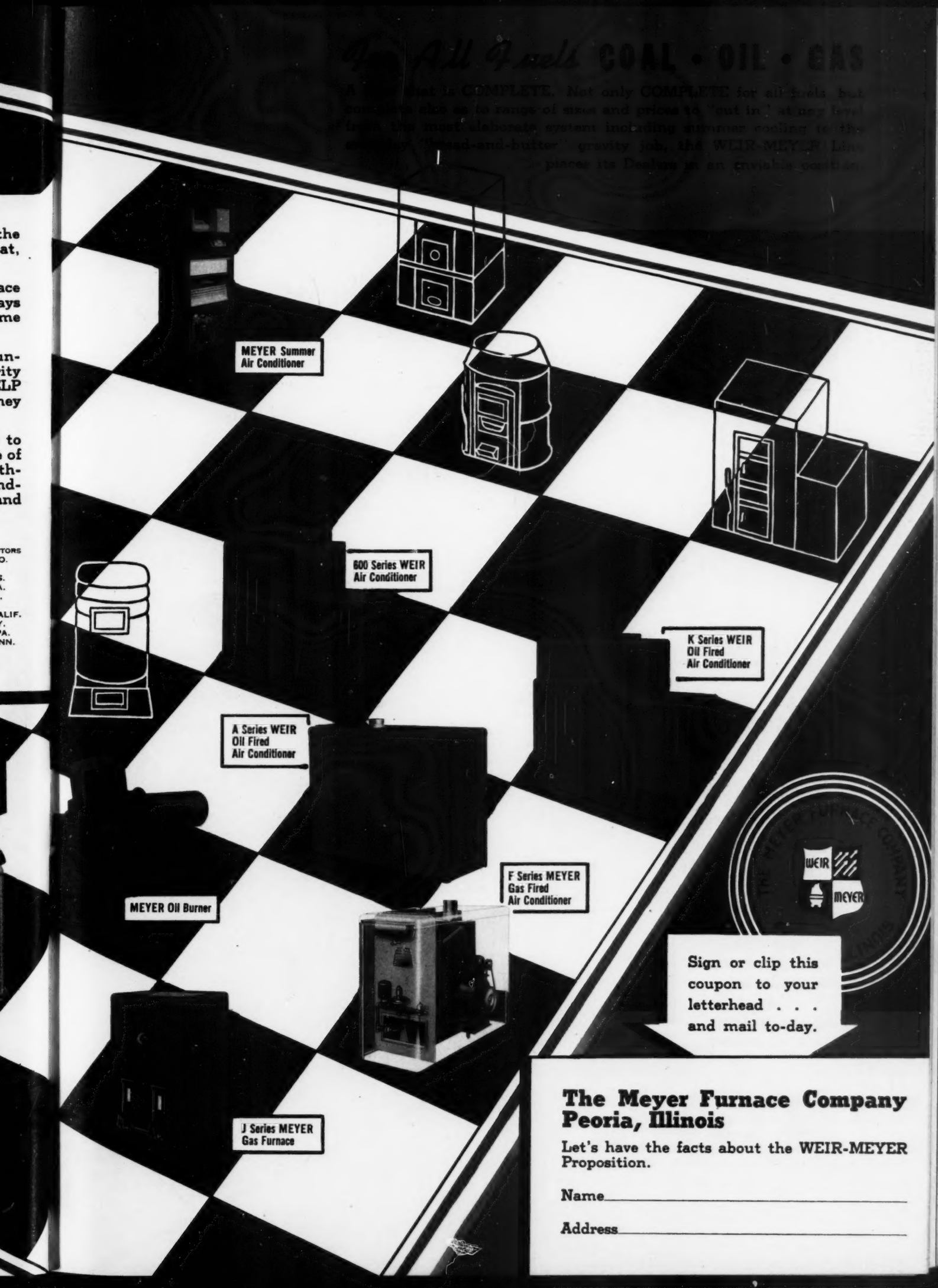
THE MEYER FURNACE COMPANY
PEORIA, ILLINOIS

Manufacturers of WEIR AND MEYER STEEL FURNACES & AIR CONDITIONING APPLIANCES . . Established 1866

BRANCHES & DISTRIBUTORS
KANSAS CITY, MO.
OMAHA, NEB.
GREEN BAY, WIS.
PITTSBURGH, PA.
DETROIT, MICH.
ST. LOUIS, MO.
SAN FRANCISCO, CALIF.
NEW YORK, N. Y.
PHILADELPHIA, PA.
MINNEAPOLIS, MINN.
ATLANTA, GA.


C Series WEIR Furnace
WEIR Stoker
TC Series WEIR Air Conditioner
SW Series WEIR Stoker Fired Air Conditioner
P Series WEIR Furnace
MEYER "Blo-Aire"

SIXTH
INTERNATIONAL HEATING & VENTILATING EXPOSITION
LAKESIDE HALL
CLEVELAND, OHIO
January 22-26--1940


MEYER Summer Air Conditioner
600 Series WEIR Air Conditioner
K Series WEIR Oil Fired Air Conditioner
A Series WEIR Oil Fired Air Conditioner
F Series MEYER Gas Fired Air Conditioner
MEYER Oil Burner
J Series MEYER Gas Furnace
WEIR
MEYER

Sign or clip this coupon to your letterhead . . . and mail to-day.

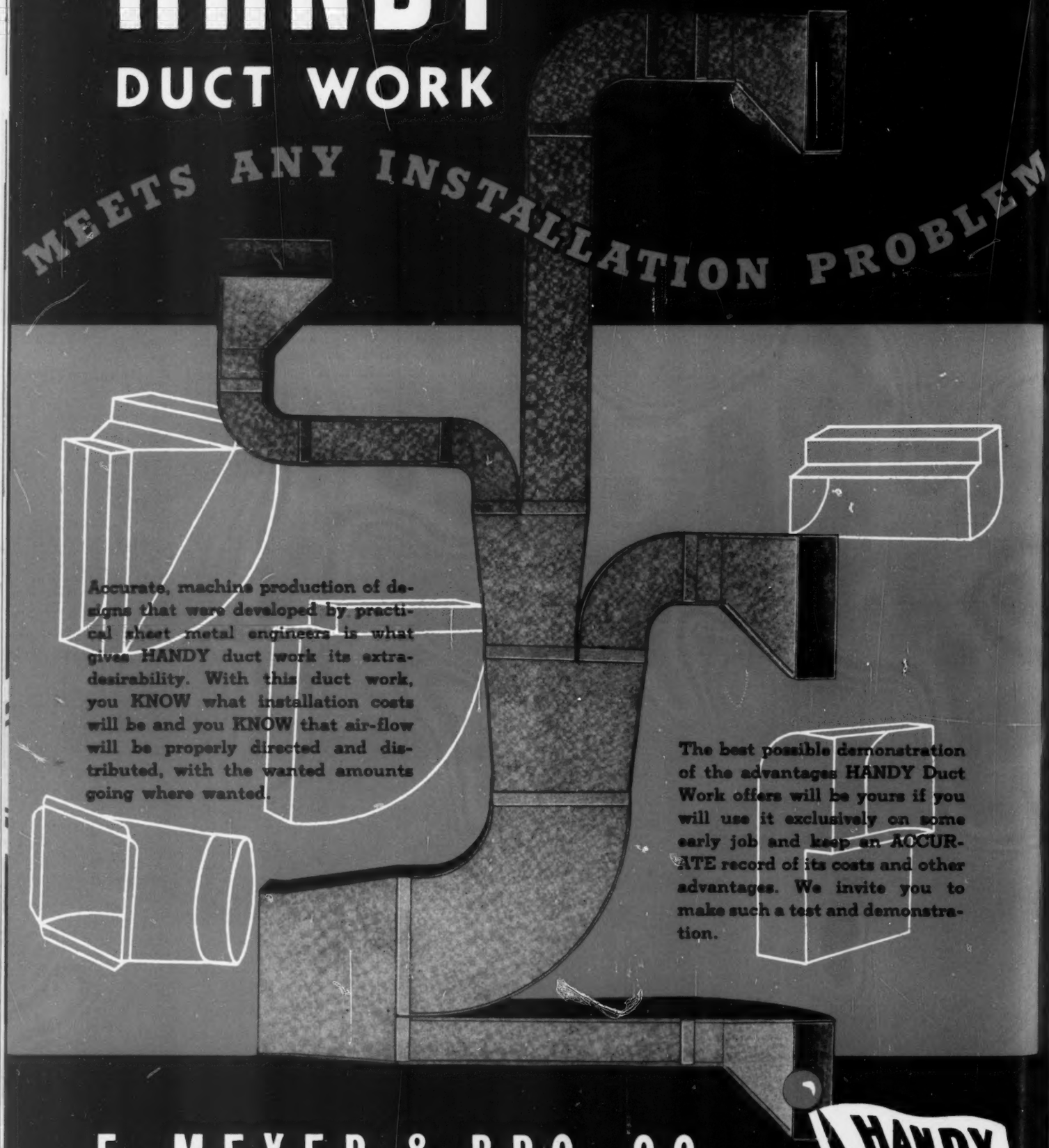
The Meyer Furnace Company
Peoria, Illinois

Let's have the facts about the WEIR-MEYER Proposition.

Name_____

Address_____

HANDY
DUCT WORK
MEETS ANY INSTALLATION PROBLEM

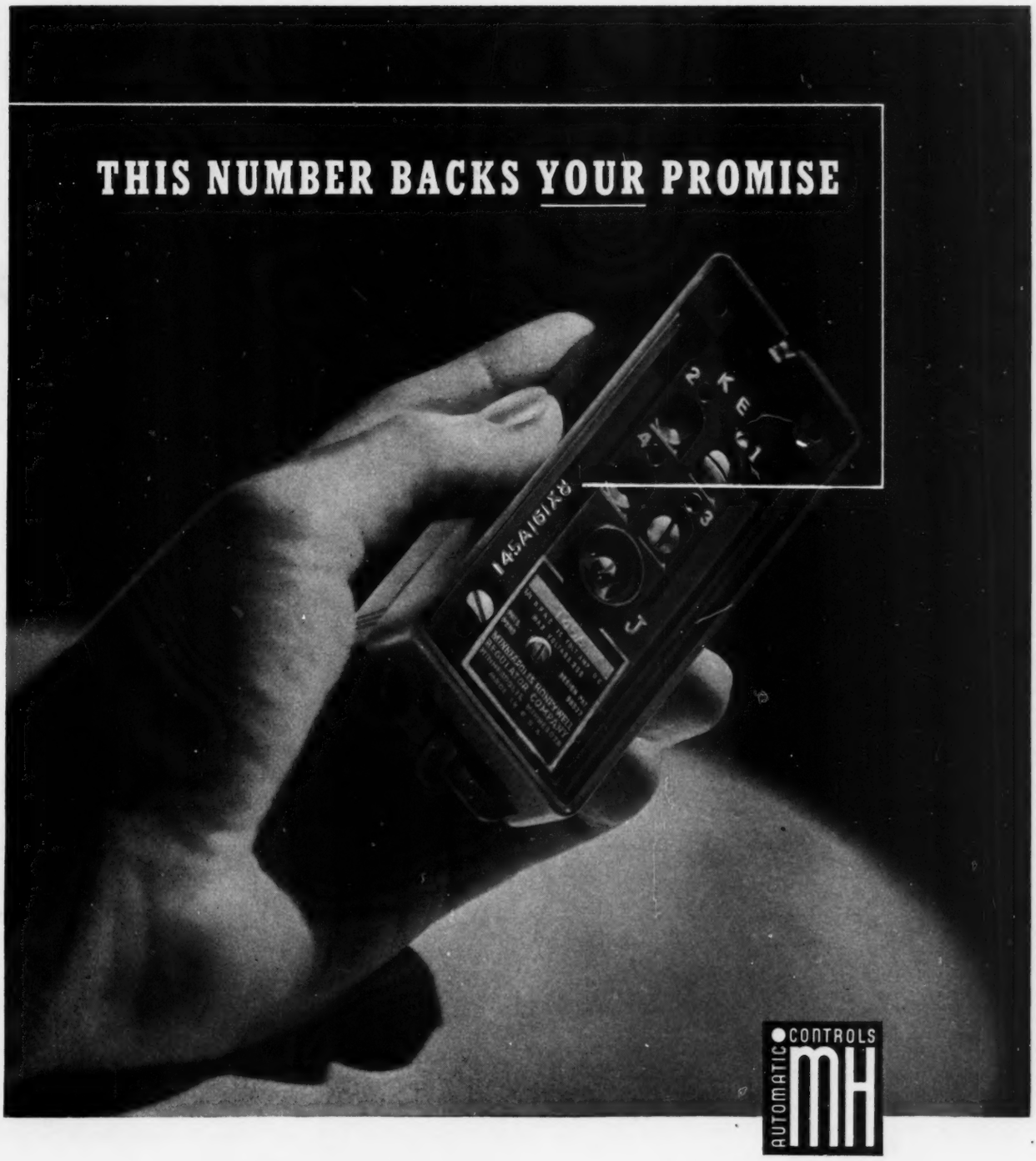


Accurate, machine production of designs that were developed by practical sheet metal engineers is what gives HANDY duct work its extra-desirability. With this duct work, you KNOW what installation costs will be and you KNOW that air-flow will be properly directed and distributed, with the wanted amounts going where wanted.

The best possible demonstration of the advantages HANDY Duct Work offers will be yours if you will use it exclusively on some early job and keep an ACCURATE record of its costs and other advantages. We invite you to make such a test and demonstration.

F. MEYER & BRO. CO.
PEORIA, ILLINOIS

HANDY
MEYER



INSPECTION NUMBERS like this are enduring insurance, backing your promise of carefree comfort and economy on every sale of your own automatic heating equipment. Seldom seen, seldom mentioned, they are silent symbols of the care and precision which go into the manufacture of every instrument bearing the name of Minneapolis-Honeywell . . . Minneapolis-Honeywell Regulator Company, 2726 Fourth Avenue South, Minneapolis, Minnesota. Branch or distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL *Control Systems*

15 Ways to BIGGER

GRAVITY • PIPELESS • ROUND or SQUARE CASED

HAND FIRED — **COAL** — STOKER FIRED

300 SERIES

Round Cased Gravity.
Low in cost.
Sizes—20, 22, 24, 27.
Head and pouch cap welded inside and out.
Heavy, center dump duplex grates.
Extra heating surface.

600 SERIES

Round Cased Gravity.
A quality product yet low in price.
Made in six sizes, 20″ to 34″.
Sizes 20″ to 27″ have cast or steel fronts.
Riveted and welded body and radiator.
Double smoke outlet.

300 PIPELESS

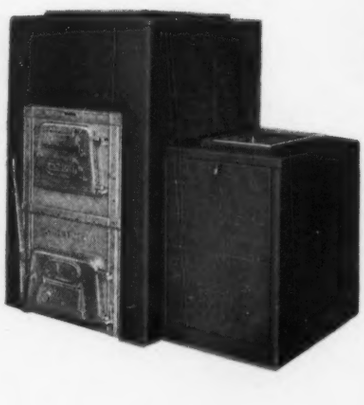
Pipeless.
Body same as 300.
Made in four sizes, 20″ to 27″.
Extra heating surface.
Register—standard equipment.
Clinker resisting brick.
Heavy grates.

3200 SERIES

Square Cased Gravity.
Same body as 300 series.
Radiator square for better distribution of air inside casing.
Water pan located in casing.
Beautiful green crinkle finish.

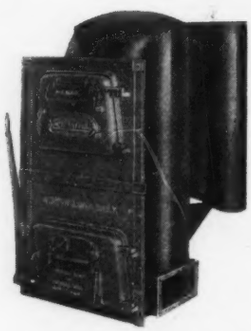
3300 SERIES

Square Cased Air Conditioner.
Made in 4 sizes, 20″ to 27″.
300 series drum and square radiator.
Steel front.
Green crinkle finish.



6600 SERIES

Square Cased Air Conditioner.
Made in six sizes.
Same drum and radiator as 600 series.
Beautiful green crinkle finish.
Cast front.
All refinements.
A truly fine furnace.

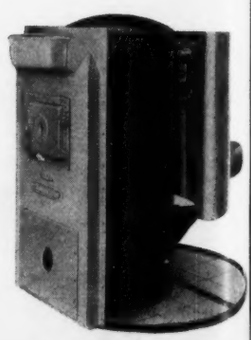


STOKER MODEL

All coal fired jobs suitable for stoker firing.
Chute provided on either side and grates omitted.
Firebrick furnished as standard with stoker model.
Stoker chute can be furnished on 3300 and 6600 series.

OIL FIRED MODEL

300, 3300 are very suitable for oil burning.
Grates and brick omitted.
No refractory furnished.
Observation port provided in feed door.
Burner plate provided in place of ashpit door.



PROFITS in 1940!

AIR CONDITIONING • ALL STEEL FURNACES

OIL

GAS

C SERIES

Air Conditioner.

Made in sizes 75, 100, 125, 150, and 190, thousand B. T. U. at register.

With or without burner.

7 gauge drum, 12 gauge radiator.

Green crinkle finish.

G SERIES

Gas Fired Air Conditioner.

Made in two sizes, 63 and 90, thousand B. T. U. at register.

Package units (completely assembled ready to set in basement).

Green crinkle finish.

CL SERIES

Air Conditioning Unit.

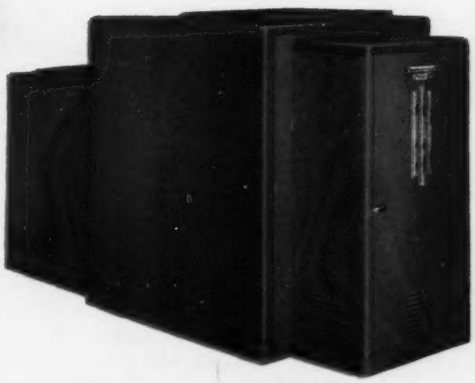
Made in sizes from 250 to 500, thousand B. T. U. at register.

Suitable for factory, school, church, or other large installations.

Oil burning.

Efficient.

Green crinkle finish.



GH SERIES

A Gas Fired High Boy Air Conditioner Utility Room Heater.

Complete with burner, blower, and all controls.

Green crinkle finish.

GR 930

A Gas Fired Gravity Furnace.

Input 110,000 B. T. U.

455 sq. inch Leader Pipe.

Square cased in green crinkle finish.

M SERIES

Air Conditioner.

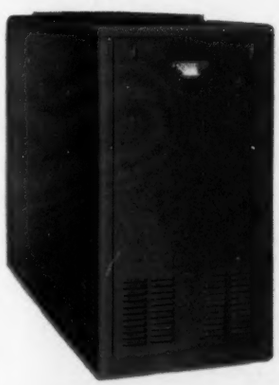
85000 B. T. U. at register.

Designed for small homes.

With or without burner.

Next larger size, the M100, is similar in appearance to C series shown above.

Green crinkle finish.



MGR 100

An Oil Fired Gravity Unit.

Designed strictly for oil.

Beautiful square casing finished in green crinkle.

Comfortzone

A name that indicates a high standard of value.

A Company with advanced engineering and manufacturing facilities.

AMERICA'S FINEST FURNACES

MICHIGAN TANK & FURNACE CORP

14101 PRAIRIE DETROIT, MICHIGAN

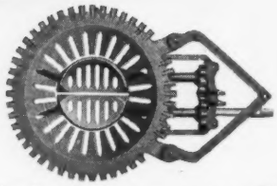
A FAMOUS NAME—A FAMOUS LINE
A GREAT NEW SELLING PROGRAM

IT'S ROUND OAK

★ If you're looking for an outstanding line of coal-burning, oil-burning warm air furnaces and air conditioning equipment . . . a well-rounded, fast-selling line that talks in terms of healthy profits . . . *it's Round Oak in 1940!* Never before

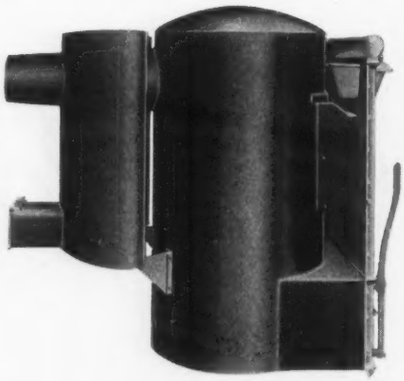
FAMOUS FURNACE VALUES

Moistair Blended-Iron gravity furnaces . . famous for quality and superior patented features. In a large number of sizes.



Duplex Grates are strong selling features. Famous for long life, easy operation and fuel saving.

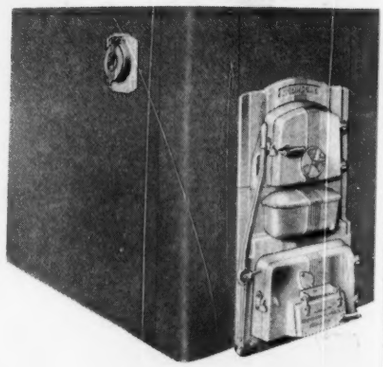
Economy Radiator, another exclusive patented Round Oak feature. Special diamond shape increases efficiency of cast iron furnace.

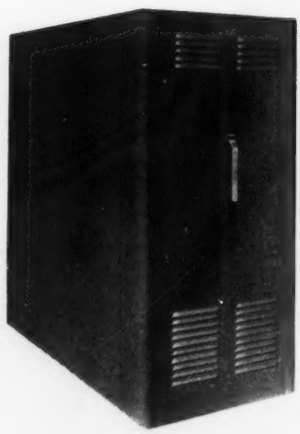


Steel Gravity Furnaces are of exceptionally fine construction. Numerous exclusive features assure remarkable performance, and dependable service. In wide range of sizes to meet all requirements.

AUTOMATIC and AIR CONDITIONING UNITS

New LX Coal Fired Air Conditioner. A compact unit with all necessary filtering, purifying and circulating equipment. An ideal coal fired package unit for winter air conditioning, in a number of sizes.





XA-80 Oil Furnace—Air Conditioner performs all functions of heating and winter air conditioning. An oil-burning unit that's easy to sell because of amazing operating economy. A real quality package at a price that opens new market for every Round Oak dealer. In 3 sizes.

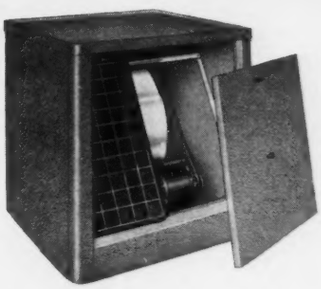
ROUND OUT

DOWAGIAC,

K IN 1940!

has this famous line been so complete. Never before have Round Oak dealers been so well equipped, to meet every heating requirement in homes of any size, any cost. And they are backed with a powerful new selling program that brings results. Why not join them today? Take advantage of everything Round Oak has to offer . . . and you, too, can reap the benefits of increased sales and profits.

Blowers for air conditioning. In cased units for all requirements. Economical to use. Easily installed.



SKX Coal Master.. designed exclusively for stoker operation. Produces completely automatic winter air conditioning at the lowest possible operating and maintenance cost. In blue Hammerloid case or plain galvanized.

Oil Burners built exclusively by Round Oak. Patented features combine principles of gun and rotary type burners.

ADVERTISING AND SELLING HELPS

As a further aid to dealers, Round Oak backs up its line with powerful advertising and selling helps .. national advertising, newspaper mat service, direct mail literature and displays.

Regular advertising in national publications such as Better Homes and Gardens and American Builder.

Left, blue silk banners with gold trim.

Complete supply of selling literature.

OTHER FAMOUS ROUND OAK PRODUCTS

★

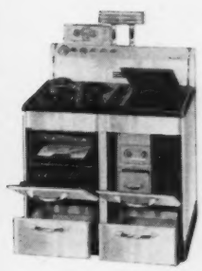
Beautiful-Saleabl RANGES

NEW DESIGN NEW FEATURES

In addition to its famous heating and air conditioning units, Round Oak builds a complete line of ranges that covers every market... coal and wood, gas, combination gas and coal, combination electric and coal. And for 1940 these are re-designed, re-styled to meet every modern demand. Investigate this great line today!

★ **Ottawa** coal range is streamlined in design, practical, dependable. A great range value.

★ **Hiawatha**— 2-oven combination range burns gas or coal or wood. Beautiful and modern. Easy to operate.



★ **Huron** heater and electric range.. a remarkable double purpose unit. Complete electric section and coal heater.

★ **Navajo** table top gas range. Smokeless broiler and other new features.

IT'S ROUND OAK IN 1940!

Mail Coupon for Complete Story

ROUND OAK COMPANY, DOWAGIAC, MICHIGAN

Send at once the complete story on Round Oak line for 1940.

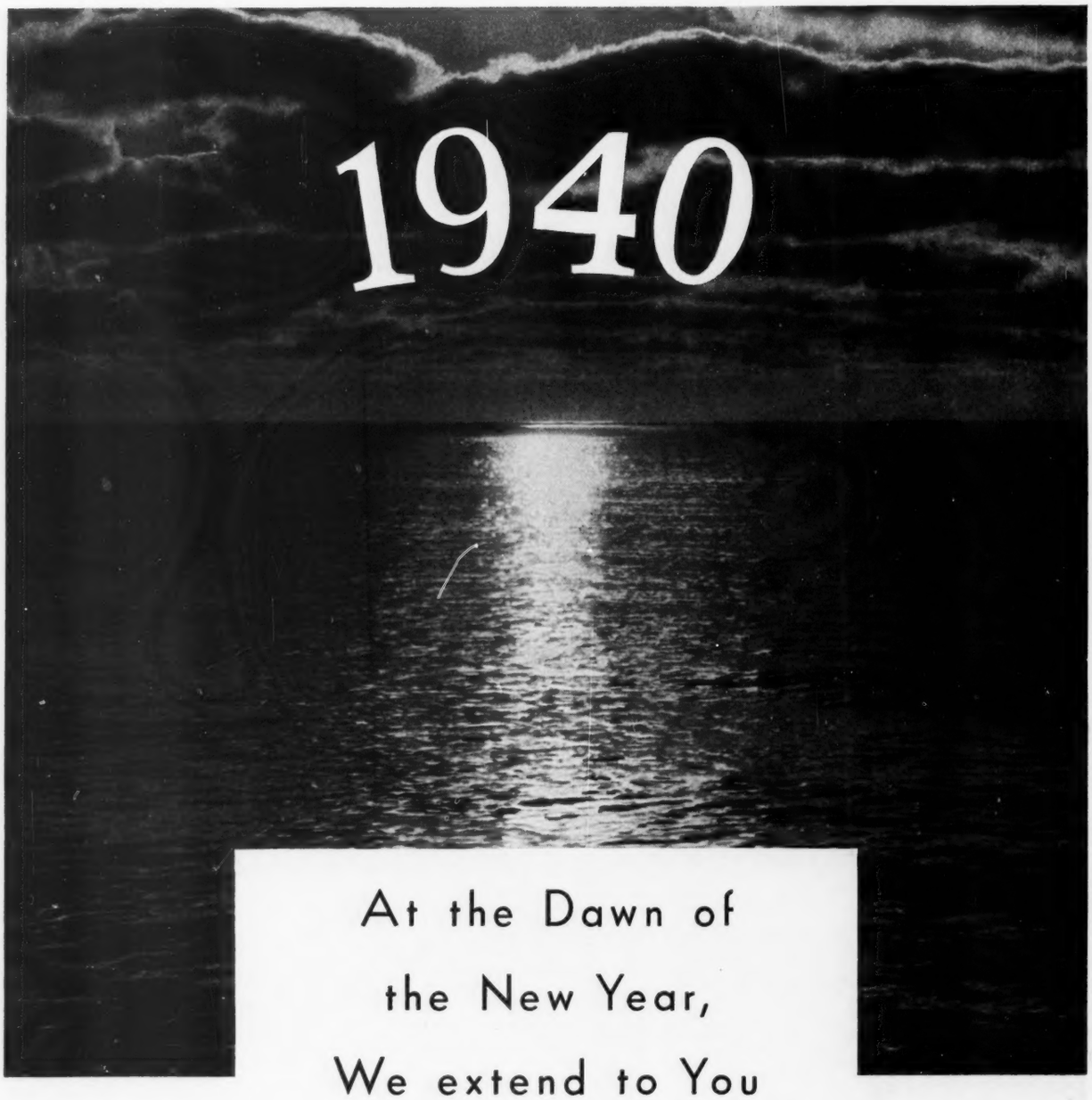
☐ Also tell me about the opportunities offered by Round Oak rang

Name_____

Address_____ State_____

Built with **ROUND OAK**

MICHIGAN



At the Dawn of
the New Year,
We extend to You
the Season's Greetings
and the Hope for
Peace and Prosperity.

THE J. M. & L. A.
OSBORN Co
Manufacturers—Distributors
BUFFALO · CLEVELAND · DETROIT
Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 81 YEARS

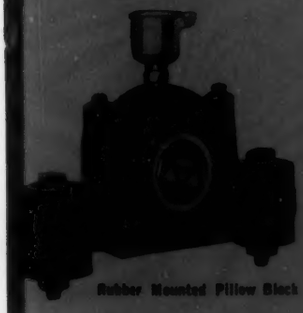
There's a *Randall* for every Pillow Block application

Universal Pillow Block

Flange Pillow Block

D.R.O.R. Pillow Block

Cut-away section of double reservoir ball for D.R.O.R., Universal, and One-Piece Steel Housing Pillow Blocks



Rubber Mounted Pillow Block

Cut-away section of single reservoir ball for One-Piece Steel Housing Pillow Block

One-Piece Steel Housing Pillow Block

Standard Pillow Block

Cut-away section of single reservoir ball for Standard and Rubber Mounted Pillow Blocks

RANDALL

Randall Pillow Blocks meet every requirement demanded by the air conditioning industry. Their carefully engineered design and precision workmanship are the result of a third of a century's progressive development.

Randalls prevent costly interruption of service, reducing maintenance cost. By specifying Randalls, engineers, architects, and manufacturers are assured of a high standard of dependability and performance. Randall Pillow Blocks are self-lubricating and self-aligning, unusually quiet in operation, quickly and easily installed and require minimum attention. Their acceptance as standard equipment by air conditioning, ventilating, heating equipment and furnace manufacturers is evidence of their complete satisfaction.

There are over three quarters of a million Randall Pillow Blocks operating satisfactorily in the field.

Write for the new 1940 catalog, describing in detail the complete Randall line. It is your complete pillow block buying guide—its use will protect you in the selection of efficient bearings.

Complete line of
Randall Pillow Blocks on display
Booth No. 447
Sixth International Heating
and Ventilating Exposition
Cleveland, Ohio
January 22-26

QUIET DURABLE
ECONOMICAL
SELF-LUBRICATING
SELF-ALIGNING
LOW COST
QUICKLY ASSEMBLED

RANDALL GRAPHITE PRODUCTS CORPORATION
Dept. 111 609 W. Lake St. Chicago, Ill.

Repair parts

FOR ALL HEATING UNITS

IN STOCK FOR IMMEDIATE SHIPMENT
GUARANTEED TO FIT

ALSO A COMPLETE STOCK OF

ASBESTOS PAPER & CEMENTS
BLOWERS & CONTROLS
DRAFT REGULATORS
FILTERS—DUSTOP
FITTINGS & SUPPLIES
FURNACE CLEANERS
HUMIDIFIERS
REGISTERS
TANK HEATERS
TIN FITTINGS

IN FACT WE CARRY EVERYTHING TO ENABLE YOU TO MAKE A JOB COMPLETE

BRAUER
REPAIR PARTS
STOVE FURNACE BOILER
OIL STOVE RANGE

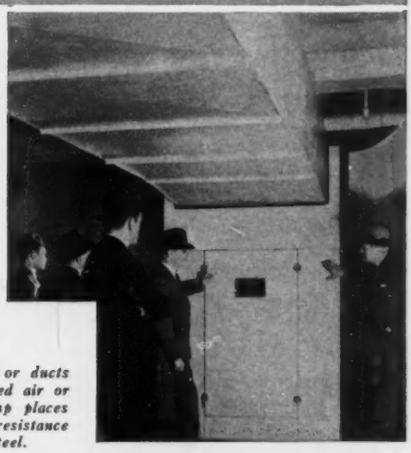
ORDER ALL FROM

A. G. BRAUER SUPPLY CO.

2100 Washington Ave., St. Louis, Mo.

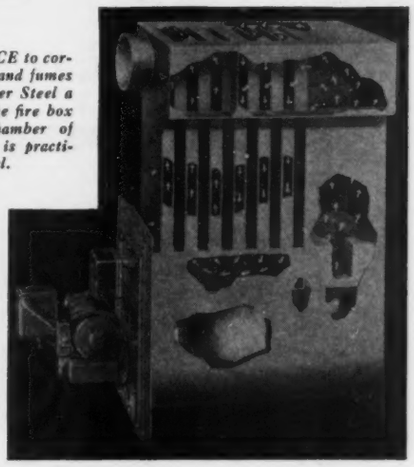
"I'll tell you why we Build with U·S·S Copper Steel

. . . our customers want high corrrosion resistance without paying a high price!"



Left and right

FAN HOUSINGS or ducts that carry humidified air or are located in damp places need the extra rust resistance of U·S·S Copper Steel.



Right

HIGH RESISTANCE to corrosion from smoke and fumes makes U·S·S Copper Steel a logical choice for the fire box and combustion chamber of furnaces. This one is practically all copper steel.

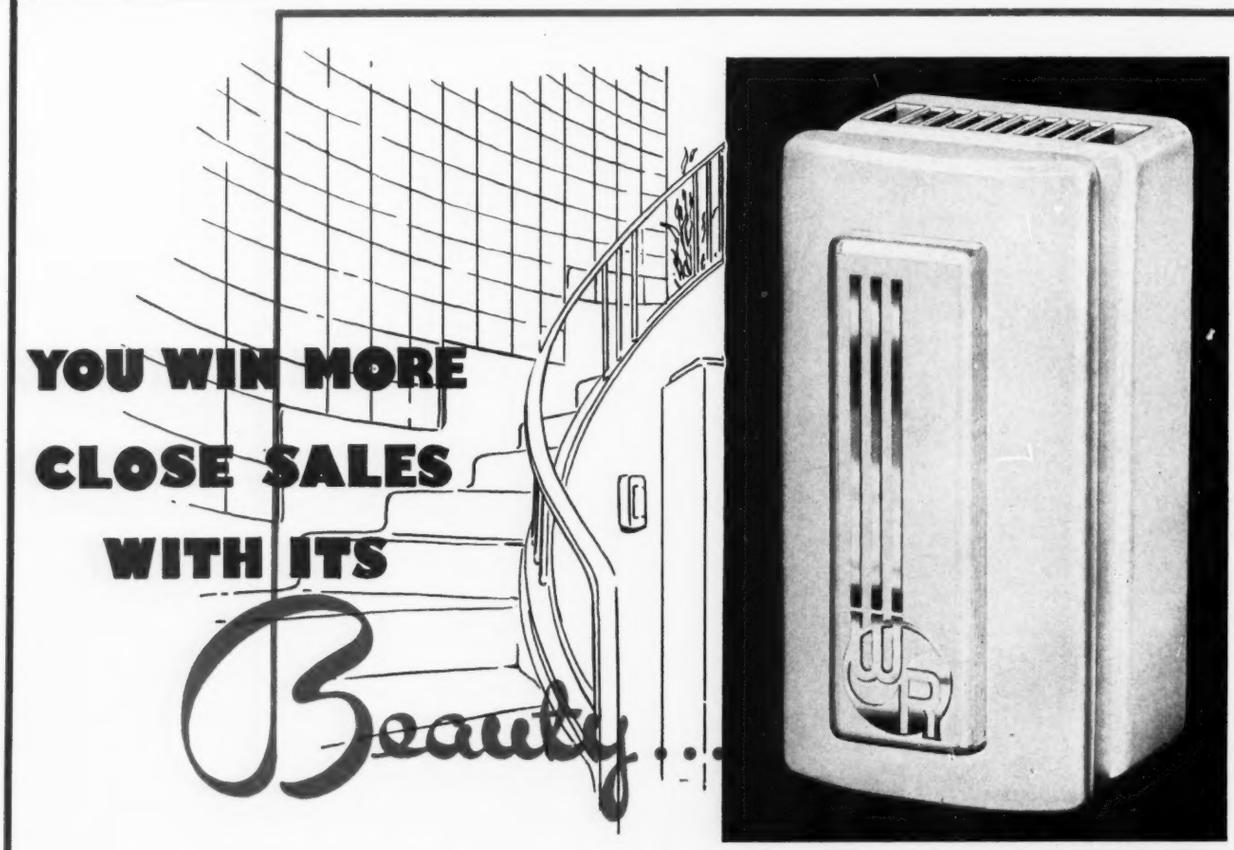
"WE'VE been using U·S·S Copper Steel regularly in all parts of our heating systems that must be protected against rust — for furnace casings, blower housings and for duct work. We know that it is satisfactory because it has given lasting service during all our years of business."

U·S·S Copper Steel has three qualities that make it outstanding for various types of heating use. First, it has two to three times the resistance of plain steel to atmospheric corrosion. Second, it has superior resistance to corrosion caused by smoke and gases. Third, its cost is so low that it makes little price difference in the completed product or installation.

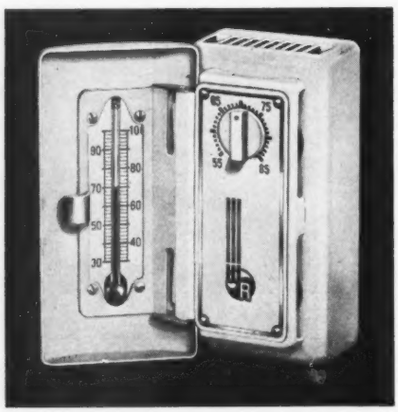
You'll find that U·S·S Copper Steel Sheets are easy to fabricate. They make possible true bends, tight seams, neat joints. Order them for your next job. They are available, either plain or galvanized, in principal localities.

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
United States Steel Export Company, New York
Scully Steel Products Company, Chicago, *Warehouse Distributors*

UNITED STATES STEEL



ITS DEPENDABILITY KEEPS IT SOLD!



The thermometer and Touch Temperature Adjustor are easily exposed with the touch of a finger—yet when not in use are concealed and do not detract from the handsome design of the thermostat. The Touch Temperature Adjustor may easily be reset even in the dark, with a minimum of effort.

When the prospect is on the fence—weighing the advantages of your heating equipment against those of your competitors—you can swing the balance in your favor with this beautifully designed thermostat. Its ivory finish will please the housewife especially because it blends with any decorative plan.

After the job is sold and your equipment installed you know the customer will stay pleased—for so dependable are White-Rodgers controls that they win praise for your equipment and new jobs for you!

A simple, unusually sensitive mechanism produces this reliable operation. Detailed information about this thermostat and other White-Rodgers controls for heating and air conditioning will be mailed to you at your request. Write today.

WHITE-RODGERS ELECTRIC CO.

Controls for Heating · Refrigeration · Air Conditioning

1215 CASS AVE. • ST. LOUIS, MO.

HOW
TO MAKE MORE MONEY
... Save Installation Time
... Have Less Grief and Worry

You can make more money for yourself and reduce the cost of winter air conditioning to your customers by taking advantage of the time and trouble-saving features of White-Rodgers stoker timers, gas valves, fan controls and limit controls.

The time required either to install a furnace fan or a complete warm-air heating plant can be reduced materially with White-Rodgers controls.

All instruments requiring calibration are easy-to-read, with uniformly marked dials, so that all adjustments can be made quickly. The differential adjustor on all fan and limit controls clearly marks both cut-in and cut-out temperatures. Trial and error methods have been eliminated.

The magnetically accelerated switch operates accurately and efficiently even when in an off-level position. This makes it possible to mount the control flush against any non-vertical surface and produces a neater installation in a shorter time.

The low-voltage circuits in White-Rodgers stoker timers and gas valves are two wire, thereby avoiding the possibility of mixing wires during installation.

White-Rodgers controls eliminate many needless service calls which are a drain on your profits.

The operating points of fan and limit controls forever remain precisely as set. There is no tendency of the control to drift or to change setting. The furnace manufacturer and user are protected from the reduction in capacity or rating that may result. Aging and fatigue have no effect on these "Hydraulic-Action" controls.

These money-saving features can help make 1940 your biggest, most profitable year. Write today for application data on all White-Rodgers controls for warm-air heating systems.

TYPE 724

Magnetic Relay Stoker Timer with line switch. For night set-back service. A reliable timer and relay for two-wire control systems.

TYPE 1910

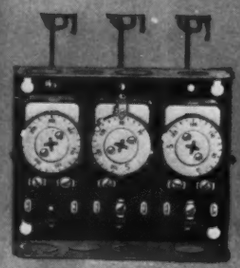
¾-inch electric diaphragm gas valve. Available sizes ⅜ inch to 1½ inch. 5-inch diaphragm. Gas-actuated. Compact.

TYPE 513

Single speed fan control (or Type 408 limit control). Range 100 to 300° F. Other ranges also available.

TYPE 519

Combination fan and limit control (or Type 523 two speed fan control). Range 100 to 300° F. Other ranges also available. Two independently adjustable switches.



TYPE 547

Combination Two Speed Fan and Limit control. Three independently adjustable switches. Reduces wiring costs. Makes neater installations.

HYDRAULIC ACTION CONTROL

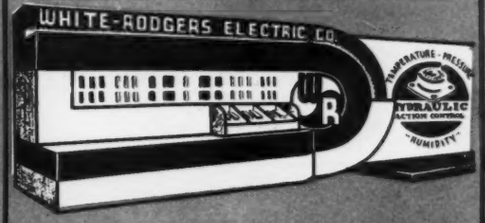
WHITE-RODGERS ELECTRIC CO.

Controls for Heating • Refrigeration • Air Conditioning

1215 CASS AVENUE ST. LOUIS, MO.

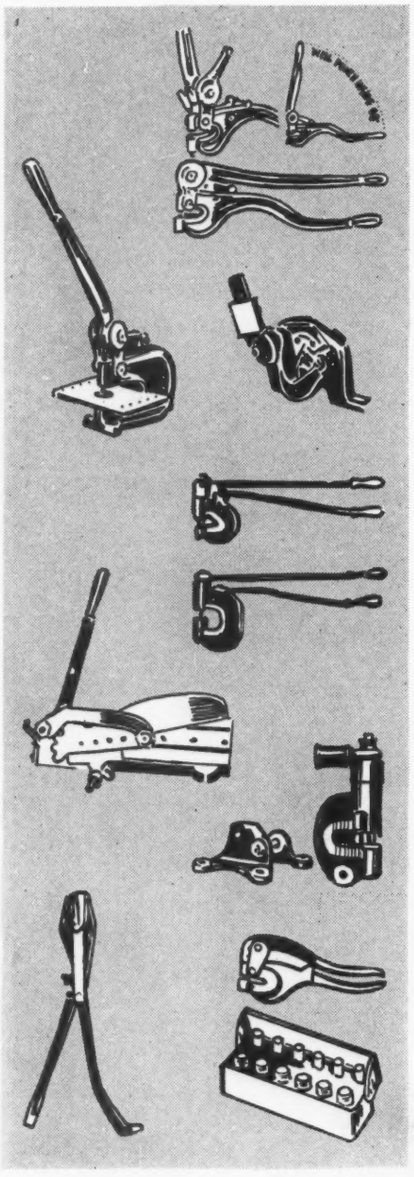
Visit THE WHITE-RODGERS DISPLAY AT THE 6TH INTERNATIONAL HEATING AND VENTILATING EXPOSITION

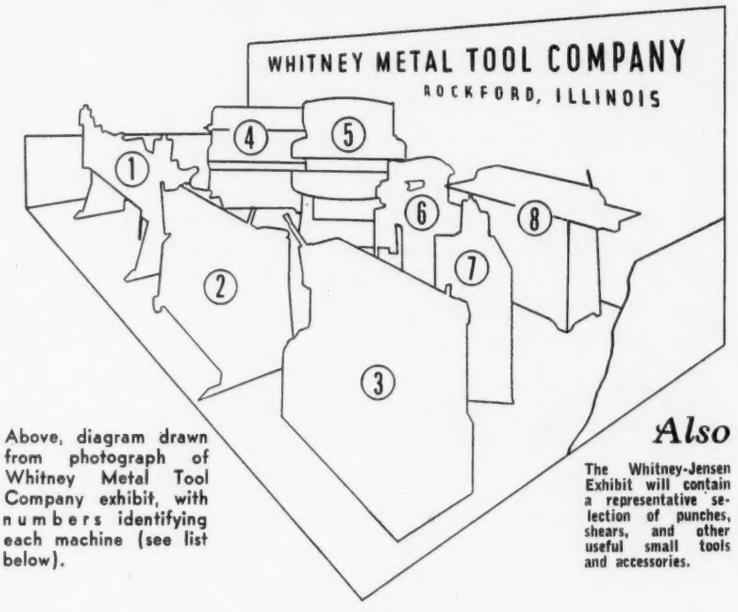
JANUARY 22 TO 26 BOOTHS 540-542



ON TO CLEVELAND!

WHITNEY-JENSEN WILL EXHIBIT . . .





Above, diagram drawn from photograph of Whitney Metal Tool Company exhibit, with numbers identifying each machine (see list below).

Also

The Whitney-Jensen Exhibit will contain a representative selection of punches, shears, and other useful small tools and accessories.

THIS year the Whitney-Jensen Exhibit will contain a greater number of sheet metal working machines than ever before. Every one of these machines is an outstanding performer. At least two of them are brand new, never shown to the trade before. Others have been improved by the addition of new and useful features. All of these machines will be in operation, demonstrating their ability in many practical ways. Every sheet metal man should see this exhibit because of what they can learn here. An invitation to drop in any time during the show is herewith cordially extended. . . .

WHITNEY METAL TOOL CO. 91 FORBES STREET ROCKFORD, ILLINOIS

SPACE No. 683
Lower Level

AT THE HEATING AND VENTILATING SHOW

Cleveland January 22-26

1 Standard 6-ft. 16 ga. Combination Bending Brake easily convertible from plain bending to box and pan bending.

2 "Air Conditioning Special," the 49-in. 20 ga. PORTABLE Combination Bending Brake, showing the new One-Man Rollaround undercarriage.

3 An interesting working half-size Model of a 16 ga. Combination Bending Brake with the upper jaw split, one half arranged for plain bending, the other half for box or pan bending. Shows outstanding features at a glance.

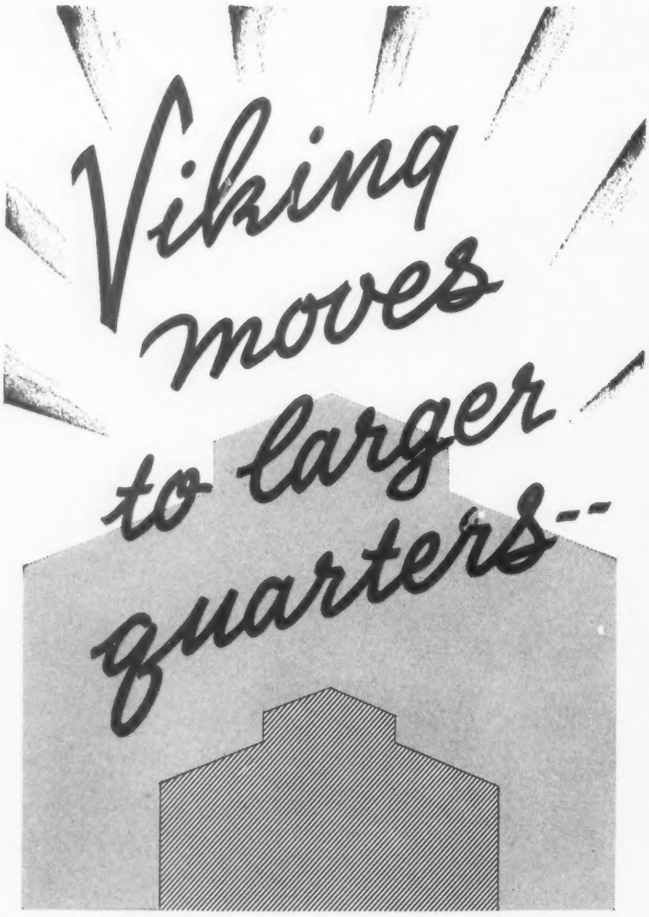
4 A brand new Gap Square Shear, operating on a new double-screw principle and having many advantages and features of great interest.

5 New and improved 4-ft. Press Brake, using the Whitney-Jensen perfected double-screw drive offering greater precision, power, and safety.

6 A Whitney-Jensen No. 58 Foot Press set up with special blanking and forming die showing how this machine can reduce manufacturing costs in many production operations.

7 Another standard No. 58 Foot Press equipped with punch and die to show speed and ease of operation of this useful machine.

8 The newest model of the Whitney-Jensen Duplex Rolling Machine, which has many valuable and exclusive features making it one of the finest values ever offered.



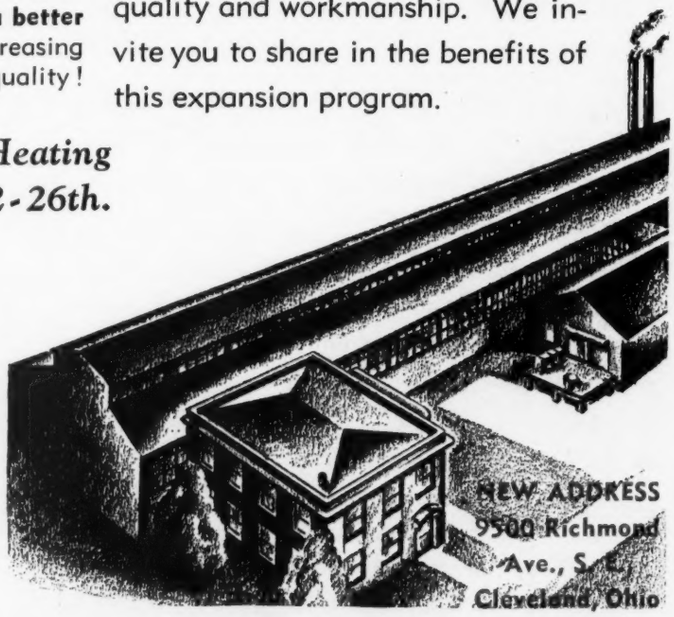
IN ITS NEW, MODERN, WELL-EQUIPPED PLANT, VIKING IS IN A BETTER POSITION TO SERVE YOU THAN EVER BEFORE IN ITS HISTORY . . . . . .

• VIKING starts 1940 in a spacious, modern factory with enlarged facilities, and new improved equipment. This ambitious program of expansion has two main objectives. First, it enables us to take care of the rapidly growing demand for VIKING products with customary VIKING promptness. Second, it offers the industry the economies of "streamlined" production methods, maintaining VIKING standards for quality and workmanship. We invite you to share in the benefits of this expansion program.

• New automatic machinery — enlarged engineering department — more extensive testing and research — all are geared to give you a **better product** at a **better price.** This is VIKING'S way of offsetting increasing labor and material costs without sacrificing quality!

See us in Cleveland at the Sixth Heating and Ventilating Exposition, Jan. 22-26th.

• Be sure to see the VIKING exhibit, located at space 652, on the lower level of Lakeside Hall. Let us show how "VIKING serves the Leaders" in the industry. We also invite you to visit us at our new plant, 9500 Richmond Ave., S. E., Cleveland, Ohio.

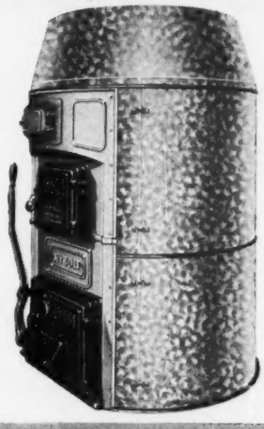


FANS . . . . .
BLOWERS . . .
HUMIDIFIERS

VIKING AIR CONDITIONING CORPORATION

RYBOLT

RYBOLT SERIES 600A7 Winter Air Conditioner with Series 600 RYBOLT Steel heating element. Attractively styled and unusually efficient and economical.



RYBOLT SERIES 15 A RYBOLT Cast Iron Furnace of outstanding quality and maximum heat power. Extra large duplex ball bearing grates. Other special features.

***READY!* THE NEW RYBOLT GASMASTER** A new gas-fired steel air conditioning unit, which is unusually compact, efficient and economical. Comes in 5 sizes for forced air, 2 sizes for gravity. Write for descriptive GASMASTER folder.

***COMING!* A NEW RYBOLT GAS-FIRED CAST IRON UNIT** Embodying many advanced features this new unit will soon be ready. It's a sensation! Watch for announcement.

RYBOLT SERIES 157 Winter Air Conditioner with Series 15 RYBOLT Cast Iron furnace for its heating element. Has all advanced features. Dependable and economical.

THE COMPLETE LINE

THAT MEETS EVERY RESIDENTIAL HEATING NEED

● The completeness and versatility of the RYBOLT line draws an ever widening circle between you and your competitors, giving you elbow room to build up your business profitably. No matter what the requirements of the customer there's a dependable RYBOLT unit to meet them at a price he is willing to pay.

RYBOLT Winter Air Conditioners in steel or cast iron, coal or gas-fired, embody modern features of the most advanced type. For the more modest budget there are the RYBOLT Furnaces, either coal or gas fired, in steel or cast iron, with a standard of quality which has made the RYBOLT name famous for more than a quarter century.

And keeping pace with the long strides of the industry RYBOLT is constantly bringing out new products of distinction to help the dealer maintain his leadership in the heating field. Write today for information on the latest RYBOLT products to be on the market shortly.

TRADE MARK

THE RYBOLT HEATER COMPANY

615 MILLER STREET ★ ASHLAND, OHIO

THE RAILROAD JOINS US *in taking a Bow!*

"We want to compliment and also thank you for the very fine service given us on our telegraphic order of the 23rd. We did not get the telegram off to you until late in the afternoon of the 23rd, and the material was delivered to us shortly after noon today (the 25th). We consider that unusual service both by yourself and the railroad."

THIS order went all the way from our St. Louis warehouse to Sherman, Texas—so it is easy to see why our customer was so pleased with both Scully and railroad service.

All over the country there are thousands of Scully customers who can testify that Scully is always on the job on regular as well as rush orders. Each of the eight Scully warehouses operates on the principle that our customers always want prompt service — so we hurry whether you ask us or not. And no matter how large or how small your order may be, it will receive the same prompt, friendly attention.

Why not call Scully the next time you need steel? And ask for a copy of the handy Scully Stock List and Reference Book. It's free, of course.

Scully Service

The Mark of Service

ALLOYS
ANGLES, HOT ROLLED and COLD ROLLED
ARCHES (CORRUGATED)
BABBITT
BANDS and HOOPS
BARS, HOT ROLLED
ALLOYS (HR and CF)
COLD FINISHED
ELECTRIC HIGH CARBON STEEL
REINFORCING
BEAMS and C. B. SECTIONS
BEEF RAIL
BOLTS, NUTS, WASHERS, ALL KINDS
BORING and TURNING BARS and GRINDERS
BRACES, BOILER
CHAIN, ALL KINDS
CHANNELS
CHISELS
CHUCKS, STAYBOLT
CLAMPS, BOILERMAKERS
CLIPS, PATTERSON
CLEANERS, FLUE
CONDUCTOR PIPE
COPPER and BRASS
COUPLINGS, HOSE
CRAYONS, SOAPSTONE
CUTTERS
DARDELET RIVET and MACHINE BOLTS
DRILL RODS
EAVE TROUGH and FITTINGS
EXPANDERS, FLUE
FERRULES, COPPER
FLANGES, BOILER and TANK
FLOOR PLATES
GALVANIZED SHEETS, BARS, BANDS
HANDLES, HAMMER
HEADS, TANK and FLANGE
HOISTS, HAND and POWER
IRON, STAYBOLT
LUGS, BOILER, TANK and SILO
MACHINERY, HAND and POWER
MANHEAD PLATES and FITTINGS
NAILS
PACKING
PAINT STICKS
PLATE STEEL, STANDARD QUALITIES
ABRASION RESISTING
COR-TEN and MAN-TEN
PLUGS, FLUE
RAILS and FITTINGS
REAMERS
SHAFTING
SHEETS
ABRASION RESISTING
ELECTRICAL
COR-TEN and MAN-TEN
HOT ROLLED and UNIFORM BLUE
WELLSVILLE POLISHED
COLD ROLLED
STAINLESS STEEL
GALVANIZED and GALVANNEALED
LONG TERNE
CORRUGATED
U·S·S COPPER STEEL
SPRING STEEL BARS and SHEETS
STAINLESS STEEL
STRIP STEEL, CR and HR
TEES
TIRE, ROUND EDGE
TOOLS, HAND and POWER for BOILER and IRON WORK
TROLLEYS
TUBES, BOILER
TURNBUCKLES
VALVES, BLOW-OFF
WELDING ROD and WELDERS
ZEES

The Mark of Quality

USS

We have big stocks on hand **NOW** *... for immediate delivery*

SCULLY STEEL PRODUCTS COMPANY

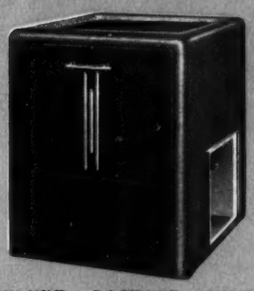
Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO · NEWARK, N. J. · ST. LOUIS · BOSTON
ST. PAUL-MINNEAPOLIS · CLEVELAND · PITTSBURGH · BALTIMORE

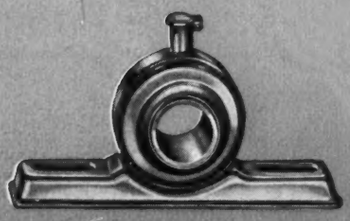
UNITED STATES STEEL

PRECISION

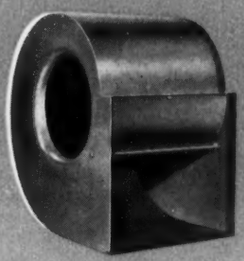
THE VITAL FACTOR BEHIND LAU LEADERSHIP in FURNACE BLOWER EQUIPMENT...



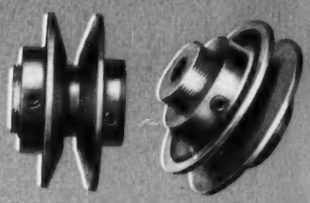
DELUXE PACKAGE UNIT FURNACE BLOWER. Knock down construction. Easily assembled. Low speed, high speed, 2 speed control available at slight extra cost. 16 sizes . . . model for every need.



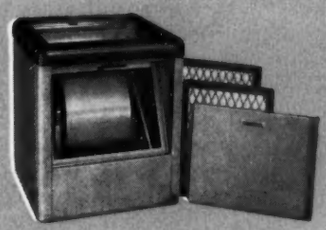
LAU PILLOW BLOCKS . . . positive self-aligning, light weight, durable. Housing die formed from heavy gauge steel. Durex Bronze bearing lubricated through pores by capillary action.



LAU BLOWER HOUSING. Extra heavy gauge steel, welded construction. Scientifically designed to guarantee uniform distribution of air.



LAU VARIABLE SPEED PULLEYS. Accurately machined from close-grained cast iron. Noiseless operation. Speed variations up to 30%.

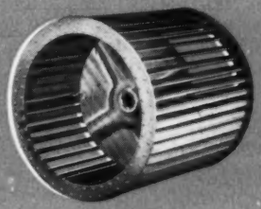


LAU BLO-ETTE PACKAGE UNIT. Shipped assembled to go through any door. Low cost for smaller dwellings.

LAU CONSTANT SPEED PULLEYS. Accurately machined from close-grained cast iron. Accurately balanced . . . true running, precision bored. (*Below.*)

LAU BLOWER WHEEL. Squirrel cage, forward curve, multi-blade type wheels. Double inlet, double width. All die formed parts. Dynamically balanced. Guaranteed true and without vibrations at operating speeds. (*Below.*)

LAU BLOWER ASSEMBLIES. Low speed, high delivery. Variable speed drive. Automatic belt tightening device. Automatic cut-out on motor. Rubber cushioned. Available with top, side and rear motor mountings. 30 sizes.



Blower Wheels for example are dynamically balanced with unerring accuracy by this machine built specially for LAU. It assures perfect balance, smooth running, quiet operation of the blower plus longer life for bearings and the entire unit. It means satisfied customers for you—no kick-backs and practically no service calls.

But this is only one of the hundreds of proving and testing operations adopted by LAU to assure highest precision and advanced standards of operation. In our newly enlarged plant, every facility for precision manufacture has been provided to make doubly certain that LAU leads the industry in quality, dependability and service.

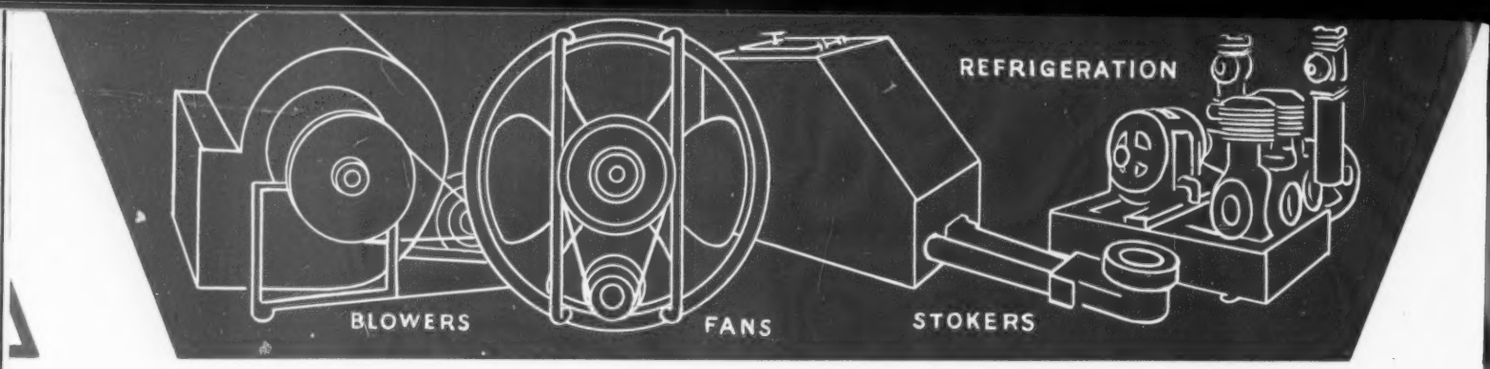
And now for 1940—a great new profit line of Lau Blower Equipment—new sizes—new designs with proved greater sales opportunity for you. When you next need such equipment as we make . . . write for complete information covering the sizes, capacities, and the mechanical improvements and superiorities of LAU precision-built equipment shown at left.

Visit our Booth No. 847

at the 6th International Home Heating and Ventilating Exposition

THE LAU BLOWER COMPANY

DAYTON • OHIO



Pulley users agree . . .

MAUREY V-PULLEYS

INSURE BETTER AND SMOOTHER-RUNNING INSTALLATIONS AND FREEDOM FROM COSTLY "CALL-BACKS"

". . . freedom from pulley worries with our first installation of MAUREY Pulleys."

". . . and we use them because they save us time and trouble."

". . . when we install MAUREY Pulleys in a job, we KNOW it will run properly."

". . . and we don't have 'profit-eating' call-backs when we use MAUREY Pulleys."

These statements and many others tell the story of the dependability of MAUREY V-Pulleys. They are designed and built to give maximum trouble-free service with F. H. P. motors in every kind of installation.

MAUREY V-Pulleys are accurately made, finely balanced and true running . . . the kind of pulley you would make for yourself, if they were not already available.

There is a MAUREY V-Pulley to fit every need—Steel, Cast Iron, or Cast Iron Variable Pitch Pulley. Ample stock in a wide variety of sizes and bores quickly available.

Write us about your pulley problems . . . we'll send complete information at once.

MAUREY MANUFACTURING CORPORATION
Wabash at 29th **Chicago, Illinois**

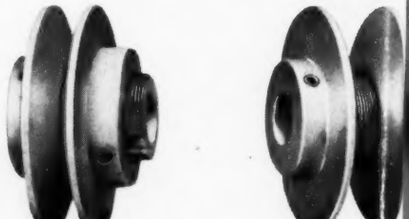
HEAVY DUTY CAST IRON

NEW 3-SPOKE CAST IRON

NEW DESIGN LIGHTWEIGHT CAST IRON PULLEY

STEEL TYPE 4, WITH MALLEABLE IRON HUB

STEEL TYPE 3, MACHINED STEEL HUB



VARIABLE PITCH DIAMETER

New Cast Iron construction. Adjustme
30% speed variations. Fine, accurate, m
threads—20 to the inch assure close adju

WHY NOT GIVE 'EM BOTH BARRELS!

...and enjoy a 12 months' profit!

SOMETHING TO SELL EVERY PROSPECT—EVERY MONTH IN THE YEAR
PROFITS from HEATING plus PROFITS from AIR CONDITIONING

PROFITS from warm air heat... a full line of winter air conditioners...*built to sell.* This offers you profits on duct work, too.

PROFITS from split systems. The last word in automatic, conditioned heating—controlled warm air heat plus winter air conditioning. Plus a prospect for adding summer cooling.

PROFITS from home summer cooling...range of equipment from single room size to whole house size. G-E Air Conditioning profits step in after your regular heating season.

PROFITS from a complete line of Commercial Air Conditioning. Winter, summer or year 'round equipment offers you sales opportunity any time *you* choose. Condensing Units from fractional up to 60 H.P.

PROFITS from air circulators. A natural for lower income homes. For homes, offices, stores, shops, factories. Another boost to off-season profits.

PROFITS FROM ADVERTISING AND DEALER PROMOTION

PROFITS from advertising. National magazine plus cooperative newspaper advertising of *your* products, in *your* territory, reaching *your* prospects, for *your* profits.

PROFITS from promotion support. If it helps you get more business, G-E *has it!* Direct mail, store identification, displays, consumer literature, specification sheets, mats, electros.

• • •

Complete lines plus healthy-sales prospects every month of the year plus the prestige of the General Electric name mean *profits.*

The coupon below is without obligation—confidential, of course.

FILL IN AND MAIL COUPON

GENERAL ELECTRIC
Automatic Heating, Cooling and Air Conditioning

GENERAL ELECTRIC COMPANY
Div. 190-153, Bloomfield, New Jersey

Give me details of the new G-E Dealer Franchise for my territory.

NAME.....

STREET.....

CITY..... STATE.....

INDEPENDENT REGISTER

Leads to Meet New Needs

INDEPENDENT definitely attained leadership more than twenty years ago when it originated "Fabrikated" Registers and Cold Air Faces.

A further advance in "Fabrikated" construction was scored in the development of "Fabrikated" Adjustable Directed Air Flow Registers and Grilles for air conditioning.

And now, at the International Heating and Ventilating Exposition, the newest "Fabrikated" production will be introduced to the trade.

Aside from marked improvements in design and construction, its favorable price will open the way to the more extended application of Independent "Fabrikated" Registers and Grilles.

Be sure to see the **INDEPENDENT REGISTER DISPLAY • BOOTH No. 451**
at the
INTERNATIONAL HEATING and VENTILATING EXPOSITION
Cleveland, Jan. 22-26, 1940

140

THE INDEPENDENT REGISTER CO.

3747 EAST 93RD STREET • CLEVELAND, OHIO

IT'S A *Cinch* TO SELL CENTURY

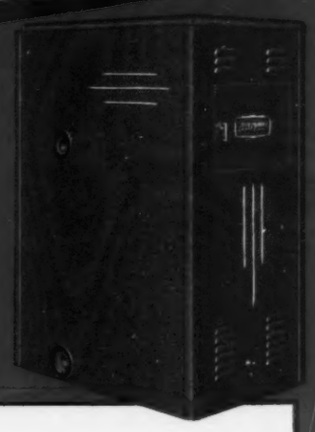
● Man, it's a cinch to sell Century. Brilliant styling with striking color tones . . . smart engineering with dozens of exclusive features . . . heating efficiency that just about approaches perfection. Plus a complete line for every heating requirement. (13 unit sizes.) Need we say more . . . except there may be a profitable franchise still available for you for '40? Write and see. CENTURY ENGINEERING CORP., Cedar Rapids, Iowa. Veteran Builders of Automatic Heating Equipment.

See us at the Cleveland Show—Space 148.

CENTURY ZEPH-O-LATOR

Warm air furnace air washer unit with air conditioning. 6-Unit Radiator type furnace delivers 85% efficiency. 3 sizes. 100-200-300,000 B.T.U.

CENTURY MODEL J OIL BURNER Famous Floating Flame principle with Even-Flo Combustion. Dozens of other fine features. Strikingly designed. No wonder it's one of America's largest selling oil burners.



CENTURY ZONE-MASTER

Boiler-Burner Unit for heating and domestic hot water. Flue-less type boiler delivers 82½% efficiency. 4 sizes 400-600-800-1000.

CENTURY ZONE-KING

FOR FORCED AIR HEATING. Ingenious dual type radiator furnace. 2 sizes, rated at 75,000 B.T.U. and 100,000.

CENTURY ZONE-QUEEN

FOR GRAVITY HEATING. Dual-type radiator furnace. 2 sizes rated at 65,000 B.T.U. and 85,000.

CENTURY AQUA-MASTER

DOMESTIC HOT WATER HEATER. 2 sizes, 150 gal. per hour at 80° rise, and 200 gal. at 80° rise.

YES... THERE'S AN OCCASIONAL "BLACK SHEEP" IN EVERY FLOCK!

But your chances of getting one in the Crestoloy flock are less than One in a Thousand!

A careful analysis of our records for 1937, '38 and '39 discloses the interesting and significant fact that fewer than one Crestoloy Wrench in a thousand was replaced for any reason whatsoever! That's rather an exceptional record but it still isn't good enough to suit us. Consequently, our research engineers continue their ceaseless efforts that even the "occasional one" may be eliminated.

The enviable reputation of Crestoloy Wrenches for extra performance and value has been justly earned. Make these better tools your choice. All Crestoloy Wrenches are fully guaranteed.

Made in 7 Single End patterns from 4 to 24" and 2 Double End patterns combining 4-6 and 6-8" head sizes. All are chrome-plated with polished heads and non-slip handle finish. Fully guaranteed.

CRESCENT TOOL COMPANY, JAMESTOWN, NEW YORK

CRESTOLOY STEEL WRENCH

Drains itself dry on a level bed!
Kearny High School, Kearny, N. J., where Anaconda Through-Wall Flashing has recently been installed. Architects: Behet & Krahmer, Newark, N. J. General Contractors: The Carlson Company, Montclair, N. J. Sheet Metal Contractors: Schiller & Plevy, Newark, N. J.

Anaconda Through-Wall Flashing

INSIDE CORNER FLASHING
Dam side
Counter flashing
Standard inside corner flashing unit. Dam on inside, drains out.
OUTSIDE CORNER FLASHING
Dam side
Standard outside corner flashing unit. Dam on outside, drains in.

Kearny (N. J.) High School uses this scientifically designed copper flashing to obtain protection against wet walls and heaving by frost.

In addition to providing drainage in any desired direction, by means of an integral dam, Anaconda Through-Wall Flashing offers these three distinct features:

1. 7/32" high zig-zag corrugations provide positive bond with the mortar in all lateral directions.
2. Flat selvage permits neat, sharp bends for counter-flashing or locking to adjacent sheet metal without distorting the flashing or interfering with free drainage.
3. It is easily locked endwise, even with edges bent, merely by nesting one or two corrugations. Such joints are water-tight because of raised corrugations.

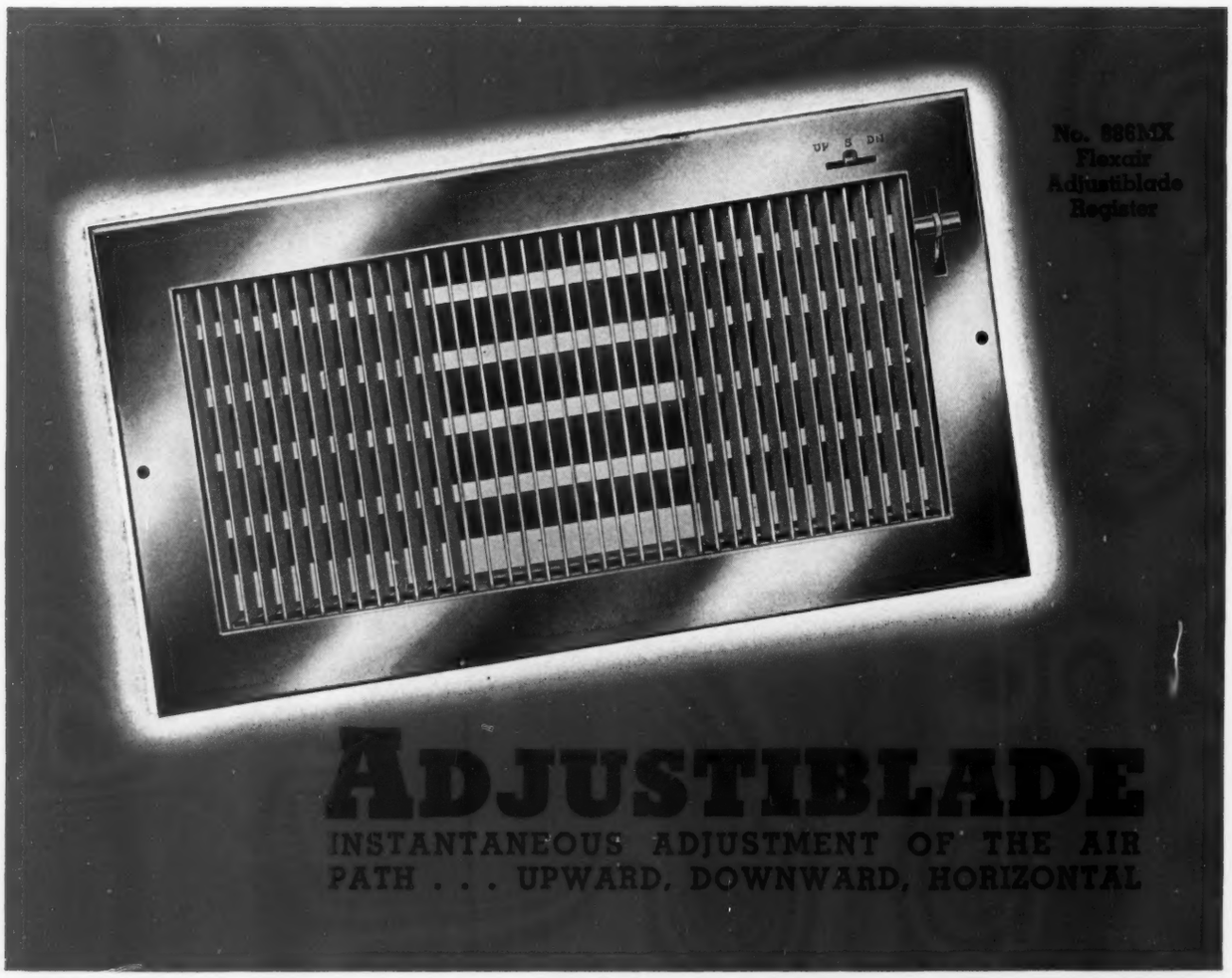
Made of 16-ounce Anaconda Copper for standard 8" and 12" walls, these flashings are stocked by leading sheet metal supply houses in 5' and 8' lengths. Also available in special widths with various selvages for walls of greater thickness. Unique one-piece corner flashings provide effective and easy assembling for standard sized walls. 4033

ANACONDA
from mine to consumer

Anaconda Copper

THE AMERICAN BRASS COMPANY, General Offices: WATERBURY, CONNECTICUT

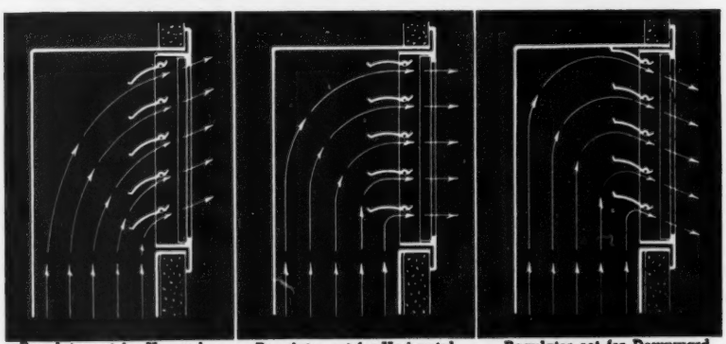
In Canada: Anaconda American Brass Ltd., New Toronto, Ontario • Subsidiary of Anaconda Copper Mining Company



ADJUSTIBLADE

INSTANTANEOUS ADJUSTMENT OF THE AIR PATH . . . UPWARD, DOWNWARD, HORIZONTAL

Adjustiblade Registers combine in a single unit the multiple features necessary to insure outstanding installations both from the standpoint of performance and appearance. The instantly adjustable back blades direct the air path 20° upward, 20° downward or straight. They also effect even distribution of the air with a uniform velocity over the entire face, thereby eliminating noise and reducing resistance to a minimum. Horizontal deflection of the air stream is provided by the vertical front bars which are available in Flexair design (886MX) for adjustable deflection, or Airline (888MX) for fixed deflection. The 16 most commonly used sizes of Adjustiblade Registers cost no more than the conventional single-valve type and are carried in stock in Prime Coat finish for immediate shipment.



Regulator set for Upward Deflection | Regulator set for Horizontal Air Flow | Regulator set for Downward Deflection

HAVE YOU SEEN?

Have you seen all the newest Tuttle & Bailey completely interchangeable installation frames? Carton packed for easy warehousing—simplified and improved.

Tuttle & Bailey

Incorporated

NEW BRITAIN, CONN.

New York Chicago Philadelphia

See Us On Parade

at the Cleveland "Show"

Keeping abreast of current developments in the sheet metal industry is a definite part of your business. That's why you'll be especially interested in the sixth biennial International Heating and Ventilating Exposition at Cleveland, Ohio, on January 22, 23 and 24.

Here the latest sheet metal products and developments will be on dress parade. Among them will be the usual imposing array of ARMCO sheet metals: Stainless Steels, PAINTGRIP, ZINCGRIP, ARMCO Ingot Iron, and others.

You'll find samples of these interesting metals at the popular ARMCO booth, and experienced men will be there to explain the advantages and advise on applications. The information these men can give you will be decidedly useful. In many cases their suggestions will help you do better work, and save money for you and your customers.

We'll welcome you at the ARMCO booth for a pleasant and profitable visit with our representatives. Should you be unable to attend this notable Exposition, see the nearby ARMCO Distributor, or write us direct. The American Rolling Mill Company, 150 Curtis Street, Middletown, Ohio.

ARMCO

ARMCO SHEET METALS

Wide Acceptance by Leading Manufacturers of Air Conditioning Equipment Proves the Value of

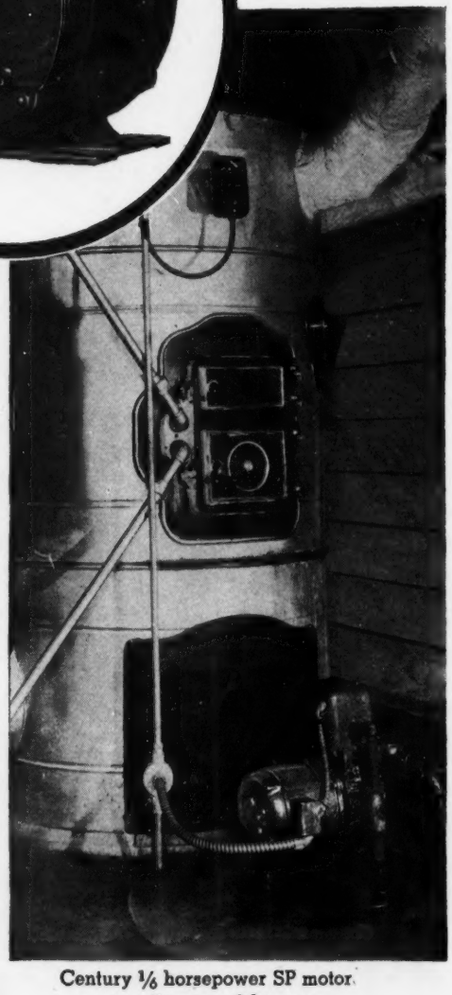
Century Specified Motor Performance to You....

CONDENSING UNIT compressors, oil burners, stokers, attic fans, unit heaters, air conditioning furnaces, all present individual power requirements, necessitating specialized application of motors if peak performance is to be obtained. Because Century Motors meet these varied requirements of the heating, cooling and air conditioning industry, many leading manufacturers have standardized on Century Motors to power their equipment.

Such advantages as high starting torque, ability to start and accelerate to full speed easily, quiet operation, protection against damp basements, attractive exterior appearance—all these are found in Century Motors.

The Century line of electric motors, of types and ratings from fractional to 600 H. P. is so extensive that it offers a motor to properly match practically any application in your field. As a result, manufacturers, dealers, service men and users of air conditioning and heating equipment find that Century Specified Motor Performance means greater profit, sales, economy and satisfaction — for everyone concerned.

There's a Century Motor Specialist near you who will gladly explain Century Specified Motor Performance and how it means greater sales and profits for you. He's backed by the entire Century organization, and by more than 37 years' experience of working in close cooperation with manufacturers of air conditioning equipment. Call him in.



Century 1/6 horsepower SP motor operating an oil burner.

CENTURY ELECTRIC COMPANY

1806 Pine Street St. Louis, Missouri

Offices and Stock Points in Principal Cities

Century MOTORS

One of the Largest Exclusive Motor Manufacturers in the World

Chrysler's AIRTEMP

PRESENTS the Fastest Selling Complete Line of Heating Equipment for 1940!

Now Look—

There just isn't room to show you all of them, but—there are 20 models in the 1940 Airtemp line.

Read Facts on Next Page—then Mail this Card—TODAY—for Full Details →

Postage Will be Paid by Chrysler Corp.

BUSINESS REPLY CARD
First Class Permit No. 885
Sec. 510, P. L. & R. Dayton, Ohio

No Postage Stamp Necessary If Mailed in the United States

AIRTEMP DIVISION,

CHRYSLER CORPORATION,

DAYTON, OHIO

And Here You're Looking at the Last Word in Automatic Heating!

Below you see the AIRTEMP Twin Airflow Oil Burner

With sales features you can easily demonstrate to a prospect and operating features which save more fuel—there's no better oil burner on the market today!

And don't overlook these facts
—the Skilled Engineering
—the Manufacturing Facilities
—the Merchandising Success
—and the Value of the name CHRYSLER!

At the Right Model B and C-10 Oil Burner

Here's a conventional oil burner with modern styling and "good looks." Lots of sales features and operates economically, too.

MAIL THIS CARD TODAY!

AIRTEMP DIVISION, CHRYSLER CORPORATION

DAYTON, OHIO Dept. 12 - A A

Send me details on the outstanding AIRTEMP 1940 heating line.

Name.....

Address.....

City.....*State*.....

We now sell.....

.....

See Our Exhibit at the Sixth International Heating and Ventilating Exposition January 22 to 26.

CLEVELAND, OHIO
(Lakeside Hall)

Leadership

Leadership involves responsibility for continued progress. Monmouth took humidification out of the horse-and-buggy stage and put it on a scientific basis. This means our work is never done. Regardless of how good our present systems may be, we must constantly strive to make them better.

That Monmouth will continue to be the greatest name in humidification is evidenced by these five important "firsts"—

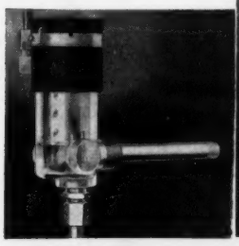
1. The development of the first vapor-diffusing plate.
2. The first dependable float control.
3. The first fully automatic weather-graduated humidity control.
4. The first visible-feed room-control unit.
5. The first to place capacity ratings on the same scientific basis as the data on furnaces, blowers, filters, etc.

There is a Monmouth Humidification System for every purse and purpose. If your files do not contain complete Monmouth data, send for it today. And visit our exhibit at the International Heating Exposition.

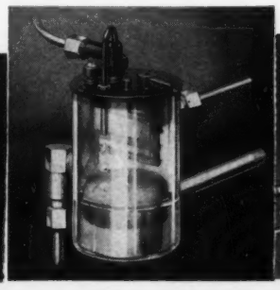
MONMOUTH PRODUCTS CO.

1933 E. 61st St., Cleveland, O.

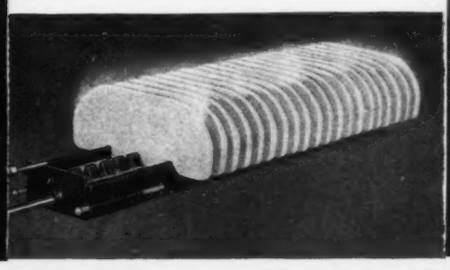
Micro-Feed — A low priced completely automatic humidity control for gravity systems. Graduates indoor humidity according to outside temperature.



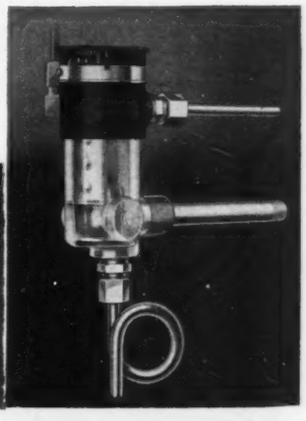
Flotrol — The first genuinely scientific float control. Non-liming. Convenient control permits adjustment.



Monite Vapor Diffusing Plates—Ample capacity even with low bonnet temperatures and intermittent blower operation.



Humidigrad — The last word in automatic weather-graduated humidity control. Includes filter and pressure governor.



MONMOUTH

The Greatest Name in Humidification

AT CLEVELAND

Aldrich Presents

NEW Models, Low Prices

Highest Quality Ever Produced
Lowest Prices Ever Quoted.

See the "NEW DEPARTURE" High Pressure Model that will more than merely compete. It will set the pace in 1940!

See the "NEW DEPARTURE" Low Pressure Model! Entirely new principles involved. Almost as low in price.

Their features, design and performance set new standards. Efficiencies higher than heretofore thought possible with small fires. *Positively no pulsating fires IN ANY FURNACE OR BOILER!* Capacity 2 qts. to 2 gals. per hour.

PRICED TO GET ALL THOSE FHA JOBS!

AND SEE THE NEW "TRIUMPH" MODEL THAT BURNS *ANY* FUEL OIL— EVEN DOWN TO NO. 6!

In jobs as small as 2 quarts per hour— *and at no premium in price!*

In operation in our booth!

These (and all other Aldrich Products) will be coming from a new plant with new equipment—and both ALDRICH DEALERS and ALDRICH COMPANY will "go places" in 1940!

Don't delay—"join up" with ALDRICH before someone else beats you to this line!

Full newspaper-page consumer advertising is available.

SEE OUR EXHIBIT

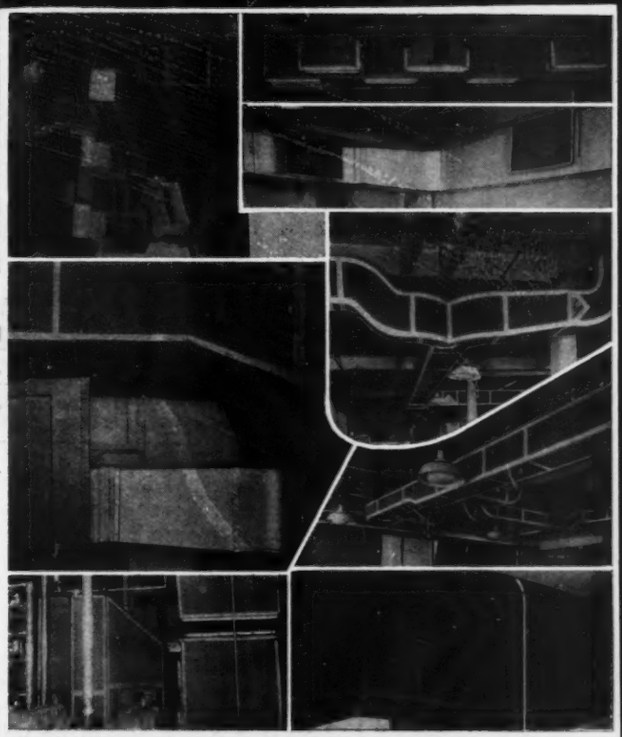
SIXTH INTERNATIONAL HEATING & VENTILATING EXPOSITION
LAKESIDE HALL
CLEVELAND, OHIO
January 22-26 - - 1940

ALDRICH COMPANY

PEORIA *"World's Largest Producer"* ILLINOIS

DUX-SULATION · DUX-SULATIO

Costs DECREASE When You INSULATE DUCTS *with* DUX-SULATION!



DUX-SULATION is 36" wide and each roll contains 100 Square Feet. Directions in each roll.

Asbestos Protected DUX-SULATION is the one Insulating Material for HEATING, AIR CONDITIONING and VENTILATING work. It has been developed and approved by the Air Conditioning Industry. Built into DUX-SULATION is every desirable feature such as—Flexibility for round, rectangular or irregular shapes—Low Conductivity (K .27 B.T.U.), 75% Insulating Efficiency—High sound Absorption—easy application — attractive appearance — *Asbestos Protected* sub-surface. DUX-SULATION insulated jobs from Coast to Coast, in Canada and in foreign countries are saving fuel—maintaining temperatures—absorbing noise and giving the most complete satisfaction.

Comes Complete

When you figure DUX-SULATION on a job, you know just what your costs are going to be, there are no extras, no fastening devices, screws, lugs, bolts or wire. Skilled labor is not required. DUX-SULATION is easy to handle in stock or on the job. All you do to apply DUX-SULATION is cut the Felt panels with a knife, paint the special Adhesive on the metal, put the Felt in place and tape the joints and corners with *Asbestos Protected* DUX-SUL-TAPE. The Adhesive and the Tape come with the roll of Felt.

Designed for Duty

Thru the construction of *Asbestos Protected* DUX-SULATION, you get the greatest possible insulation against Warm Air temperature drop, Cold Air temperature rise and condensation. DUX-SULATION installed as an inside lining has a low frictional resistance factor and no metal, screws, caps or wires protrude into the Air Stream. DUX-SULATION will not rupture, chip or crack. It conforms to the duct at all times and does not liberate particles of itself to pollute the Air Stream.

Write Any of the 4 Companies Below for Full Information

GRANT WILSON, INC. · CHICAGO
4101 W. TAYLOR STREET

PLANT RUBBER & ASBESTOS WORKS • San Francisco, Cal.
AIR CONDITIONING UTILITIES CO. • New York City, N. Y.
ATLAS ASBESTOS CO., LTD. • Montreal, Canada

MODERNIZE YOUR SHOP WITH CHICAGO EQUIPMENT

CHICAGO STEEL PRESS

NUMBER TWO FIFTY THREE

It's no secret that the Sheet Metal Shop equipped with modern time-saving equipment makes more profit and turns out far better work. Dependable, efficient tools from Dreis & Krump will put your shop in the running with the best of them.

Illustrated is the compact, ruggedly built, 48", No. 14 gauge capacity, Chicago Steel Press brake. It is ideally adapted for rapidly forming metal sections; such as in stoves, refrigerators, soda fountains, steel cabinets, metal furniture, steel boxes, etc. It can easily do 40% to 60% of the forming work turned out by the average shop. Variable speed drive operates from 17 to 50 strokes per minute. A quality item that no truly modern shop can afford to be without.

PORTABLE CHICAGO STEEL BENDING BRAKE

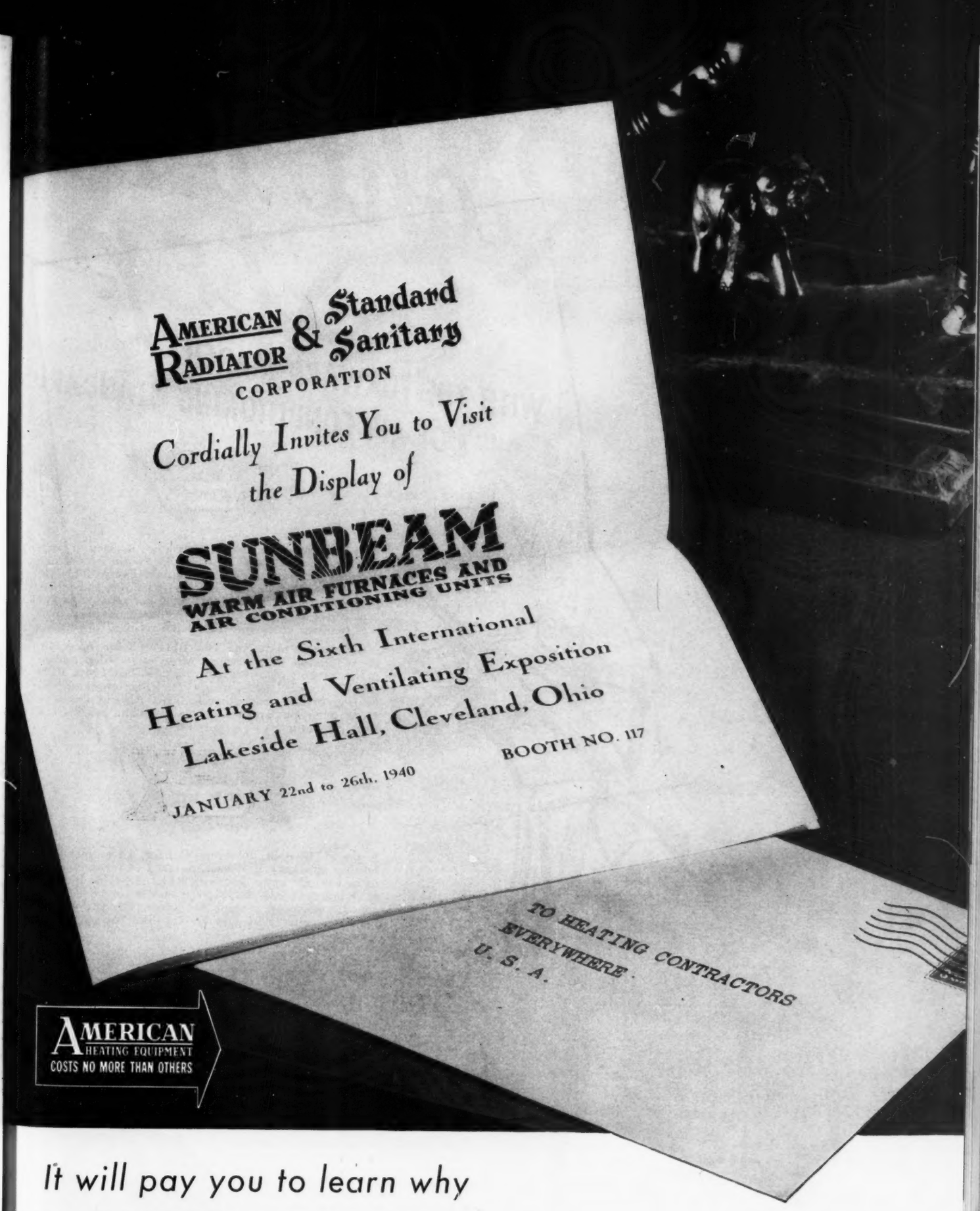
One man can set it up . . . two can carry it!

This portable brake was built to fill a definite need in air conditioning work—will bend and flatten 1/4 in. or wider seam on 22 gauge; will bend 1/2 in. flange or wider on 20 gauge—half the weight of regular brake, perfect for use on small or large jobs and ideal for general shop use. Legs swing up and make very compact piece to carry to the job. Clamping handles are made to be used for carrying. Top and bottom sections of one-piece embossed steel plates for greater strength with minimum weight. Bending lead is a solid plate reinforced with specially formed plate. One man can set it up by bringing hinged legs to upright position and locking with convenient thumb screws. No loose parts to mislay. Brake always remains firmly in place without bolting to floor.

WRITE NOW FOR LITERATURE!

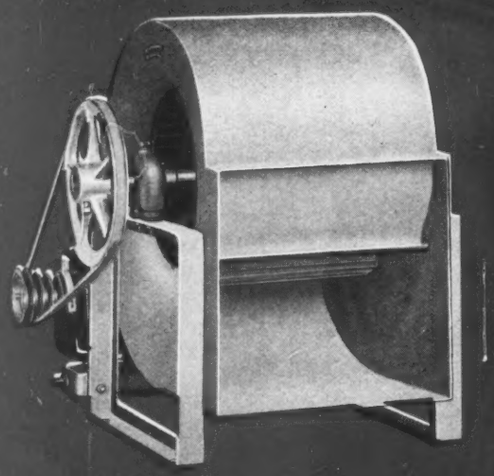
CHICAGO STEEL BRAKE

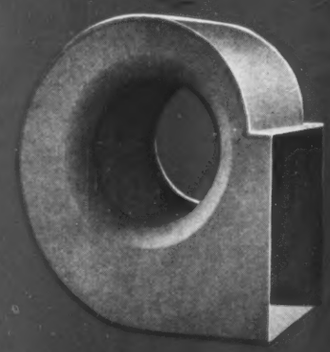
Here is a brake manufactured for any and all types of straight bending and box and pan work. Made in 35 standard sizes for up-to-date sheet metal shops. We also build special brakes for difficult jobs. Consult us before you equip your shop with production machinery. We'll show you how Dreis and Krump items will save you time, money and worry. Best by test for over 40 years.

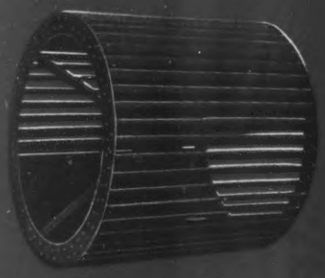
DREIS & KRUMP MANUFACTURING CO.
7404 LOOMIS BOULEVARD CHICAGO, ILLINOIS

It will pay you to learn why

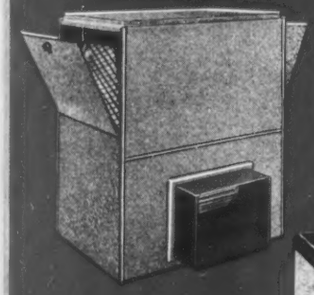
"MORE HEATING CONTRACTORS SELL SUNBEAM THAN ANY OTHER MAKE"

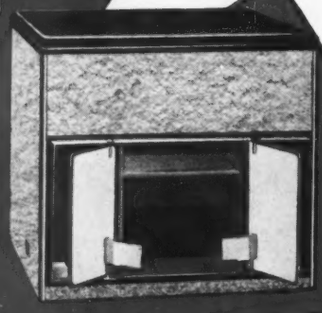
AMERICAN RADIATOR & Standard Sanitary
CORPORATION
NEW YORK PITTSBURGH











Right in Step

WITH THE FORWARD MARCH OF AIR CONDITIONING STANDARDS

REX BLOWERS

Manufacturers who use blowers as a production part find that the redesigned REX BLOWER adequately meets their requirements for ample delivery and high efficiency within definite space restrictions. Published performance data is compiled from *individual tests* for *each size* of unit—thus assuring freedom from the errors that so often creep into calculated ratings.

Contractors prefer the REX BLOWER for forced air or ventilation jobs because of its quiet, dependable performance and sturdy construction. For 1940, REX offers additional sizes, a new H. P. series, improved bearing bracket, and other features. Also available to meet your needs are wheels, housings and bearings of superior quality.

REX AIR-PAK

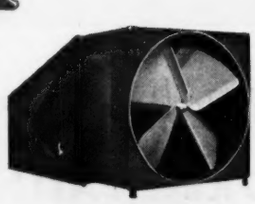
A profitable item for every furnace, sheet metal or heating appliance dealer. Thousands of furnaces need to be brought up-to-date with REX AIR-PAK blower-filter units. Four styles, sizes from 10″ to 18″, single speed, two-speed, Patrol Modulator control or the famous automatic by-pass louvers—the "original two-speed system."

VISIT BOOTHS Nos. 341-343 AT INTERNATIONAL HEATING AND VENTILATING EXPOSITION AT CLEVELAND, OHIO, JANUARY 22-26, 1940

FOR YEAR-ROUND PROFITS SELL

REX AIRATE

FOR HOMES—attic ventilation is a low-cost summer comfort system. Removes the heat stored up in the house by day; replaces it with a refreshing flow of cool night air. The REX AIR-AIRATE "Attik-Pak" model features all-steel construction throughout for long life and safety, automatic ceiling shutters for convenience and fire protection, and quiet, economical operation.



FOR BUSINESSES, FACTORIES, PUBLIC BUILDINGS—and clubs — a gentle movement of cool, fresh air is needed to promote employee efficiency and create comfortable, pleasant conditions for patrons or guests. With five different models in several sizes, REX-AIRATE offers a flexible means of creating an ideal atmosphere in summer and winter. Ask for bulletin 199 on commercial installations.

AB Air CONTROLS INC

1933 W. 114th STREET · CLEVELAND, OHIO

SEND DATA ON BLOWERS_____

REX AIR-PAKS_____ REX AIRATES_____

NAME_____

FIRM_____

ADDRESS_____

CITY_____

SEND COUPON FOR COMPLETE LITERATURE

TOP-NOTCH EFFICIENCY AT ROCK-BOTTOM COST

That, in a nutshell, is the story of

AIR-MAZE Kleenflo (TRADE MARK) AIR FILTER PANELS

PERMANENT · NEED NO REPLACEMENT · DEPENDABLE

● Your air conditioning system is only as good as the air filters you use. Therefore, it is poor economy to sacrifice efficiency for the sake of a few cents on the initial cost of filters.

In the long run KLEENFLO Permanent Filter Panels cost you less because they may easily be cleaned again and again and with reasonable care they will last as long as your air conditioning system.

They not only do away with the high cost of frequent replacements but they deliver top-notch efficiency and dependable performance at all times. They have a tested efficiency of 98.0% to 99.6% with extremely low pressure drop.

Of scientific all-metal construction, KLEENFLO filter panels are *approved by the Underwriters Laboratories* as fire retardant. They are odorless, dependable and easy to handle as they slip readily into standard size panel spaces.

Write for complete information on how KLEENFLO Air Filter Panels will save you money and trouble.

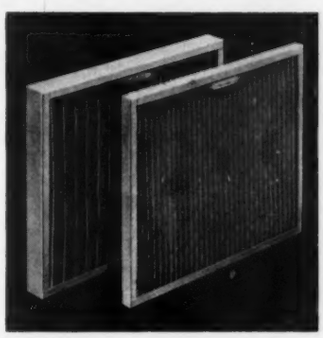
SEE OUR EXHIBIT AT THE SHOW

Because seeing is believing you are invited and urged to visit the AIR-MAZE Exhibit at the International Heating and Ventilating Exposition at Lakeside Hall, Cleveland, Ohio, January 22-26, 1940. There in the Lakeside Underground Exposition Hall you may see KLEENFLO Air Filters displayed and demonstrated.

APPROVED BY THE UNDERWRITERS LABORATORIES
(UNDERWRITERS' APPROVED SERVICING METHOD NECESSARY)

AIR-MAZE CORPORATION
5130 HARVARD AVE. CLEVELAND, OHIO

NOTE THESE KLEENFLO FEATURES



LOW UPKEEP COST

Can be serviced again and again at the cost of only a few cents, keeping them always at top-notch performance.

HOLD MORE DUST

Dust capacity 1½ to 2 times greater than conventional filters.

EASY TO CLEAN

Thoroughly cleaned by rinsing in hot water for a few minutes. Then spray with inexpensive adhesive and filter is like new again.

TROUBLE FREE

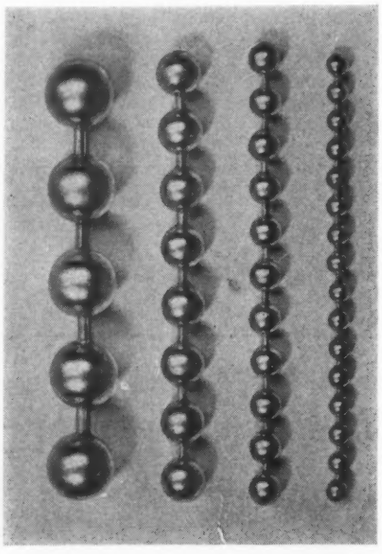
No clogging. No odor. All-metal construction resists heat and wear.

NEED NO REPLACEMENT

Because costly replacements are unnecessary and upkeep is low, KLEENFLO AIR FILTERS pay for themselves within a short time.

AIR-MAZE

BEAD CHAIN*



No. 20 BEAD CHAIN | No. 13 BEAD CHAIN | No. 10 BEAD CHAIN | No. 6 BEAD CHAIN

Illustrations Actual Size
Samples on Request

Size No.	Dia. of Bead in Inches	Approx. Tensile Strength in pounds
6	.125	25-30
10	.187	45-50
13	.250	85-100
20	.375	175-200

MATERIALS

Brass, Bronze, Gilding Metal, "Monel" Metal, Nickel Silver, Aluminum; Chromium, Nickel, Gold and Silver Plate. Standard attachments as shown, or made to customers' specifications.

• • •

CHAIN AND CORD COUPLING
(Actual size)

This coupling, No. 10-V, makes a firm detachable connection between BEAD CHAIN and Venetian blind or sash cord. It is easily applied. For No. 10 BEAD CHAIN only.

*Trade Mark Reg. U. S. Pat. Off.

The non-kinking and swiveling characteristics of BEAD CHAIN* make it advantageous for use in regulator adjustments.

BEAD CHAIN* adds but little to the cost of any heating or ventilating unit and greatly improves the appearance and operation of the finished job.

BEAD CHAIN* is adapted to sprockets that have been designed for the automatic regulation of dampers and ventilators, that work smoothly and efficiently.

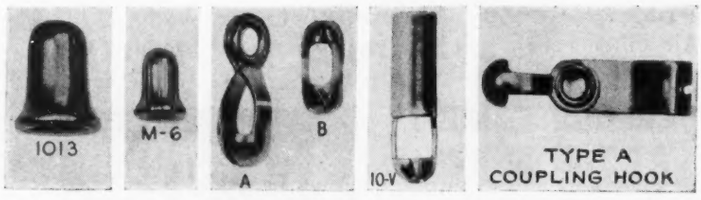
BEAD CHAIN* may be had in bulk and cut lengths, with couplings and attachments, or in assemblies to meet the specifications of the manufacturer.

BEAD CHAIN* engineering service is prepared to cooperate fully with manufacturers in the design of assemblies where the use of chain is necessary or desirable.

DETACHABLE PENDANTS

NON-DETACHABLE PENDANTS

COUPLINGS



BEAD CHAIN
ESTABLISHED 1914
Trade Mark Reg. U.S. Pat. Off.

THE BEAD CHAIN MANUFACTURING CO.

BRIDGEPORT **CONNECTICUT**

HOW *Payne* HELPS YOU WITH THE FOURTH OF THE FOUR BIG JOBS

Payne gas furnaces build your house-heating load — help you to put across your Fourth Big Job! For Payneheat not only *sells* — it *stays sold!* Every Payne owner becomes a permanent booster for GAS.

Payne furnaces sell because — for more than a quarter of a century — one person has told another that Payneheat is efficient, economical, trouble-free, *clean* heat.

Payne furnaces sell because — everywhere that gas is sold — Payne advertising hits homeowners, homebuilders, contractors and architects directly between the eyes.

Payne furnaces *stay sold* because they are the last word in fine heating, scientifically designed and precision constructed by the foremost exclusive manufacturer of gas furnaces in the country.

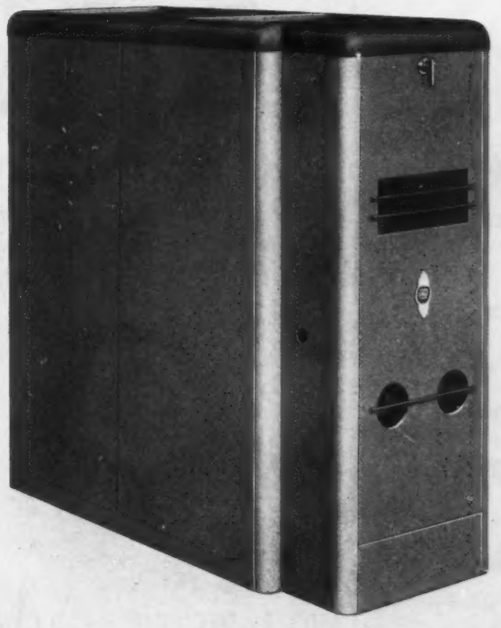
And remember this! Payne offers a *complete line* of gas heating and winter air conditioning equipment to meet *every* heating need. No sales are lost because of inability to meet a specific demand. And the famous Payne "A" Vent, universally recognized as the best venting pipe ever offered the gas heating industry, has done wonders in raising gas to a new high in efficiency.

INVESTIGATE PAYNEHEAT TODAY!

Write for full particulars

Payne has developed a plan for local advertising conceded one of the most generous and practical ever offered.

PAYNE FURNACE & SUPPLY Co., Inc.
BEVERLY HILLS, CALIFORNIA

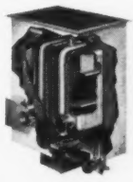


PAYNE ZONEAIR UNIT—The last word in "Spring-conditioning"—heats, filters, ventilates, humidifies and circulates. May be set up in batteries for zoned conditioning. Its streamlined beauty enhances any basement playroom.

PAYNE MODERN CONSOLE
Outstanding beauty! Efficient circulating warmth! They're both combined in this handsome floor type heater. Choice of five harmonizing colors in six different sizes. Heavy insulation assures absolute safety.

PAYNE FORCED AIR UNIT
Offers warm, filtered forced air circulation in winter, c-o-o-l-i-n-g ventilation in summer. Requiring no basement, the "FAU" may be installed in kitchen, closet or on the service porch. Automatic control.

PAYNE MODEL "A" FURNACE
May be installed singly or in batteries of two or more, each operating independently and warming separate rooms or suites. Here is *zoned* warmth, where you want it, when you want it, at controlled temperature.



PAYNE FLOOR FURNACE
Especially designed for homes without basement, but extreme simplicity of installation, economy — abundant fresh, *circulating* warmth—has made it a universal favorite. Fully vented.

PAYNE DUPLEX FURNACE
Combines multiple heating with low cost installation. Similar to the Payne Floor Furnace, the Duplex heats two separate rooms or suites on one floor or two floors. Optional push-button or thermostat control.

The A, B, C's of Registers & Grilles

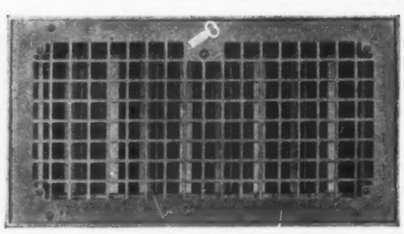
A *is for* ARROWTROL, *which gives a straight throw,*
and also for ARC-ENG, *to deflect the air flow*
and third is our AIR-CON, *the standard "De Luxe"*
made with brass bearings to lick the old rust.

B *is for* BATTERY, *the newest device,*
to control air direction and keep down the price.

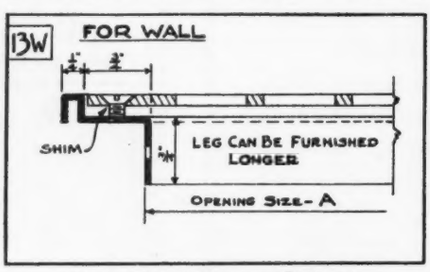
C *is for* CARE, *built into our line.*
We suggest that you try it, the results will be fine.

In name we are young, but are proud to relate
Two Centuries Experience hangs over our Pate.

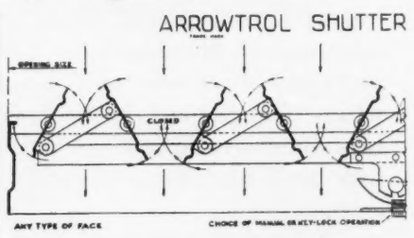
Any type Register Face can be used with any Register Shutter



Style 3370 "Arrowtrol" lock type

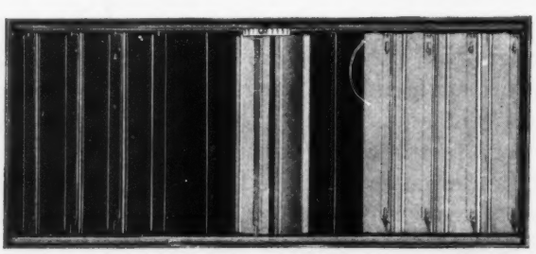


Style 13-W Plaster Flush Wall Frame

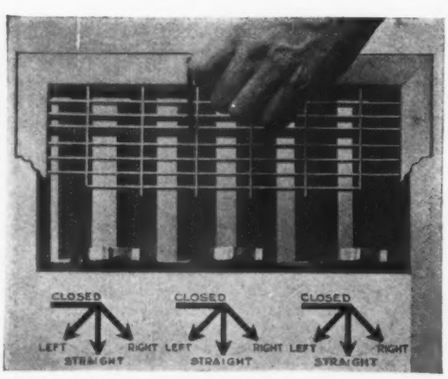


The above cut is a line drawing showing the details of the "Arrowtrol".

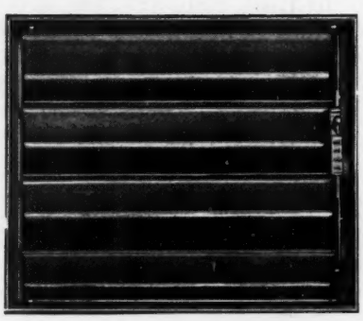
Cut at right shows the Adjustable Shutter with the right third fully closed, the center third arranged for a jet effect and the left third in normal operation.



"Arc-Eng" Adjustable Shutter Type No. 2



"AIR-CON" Shutter at right deflects air up, straight or down as desired, or may be closed entirely



Cut at left shows Style 3310, three battery, two shutters, wheel control

REGISTER & GRILLE MFG. CO., INC.

70 Berry Street, Brooklyn, N. Y.

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Make it FITZGIBBONS in '40

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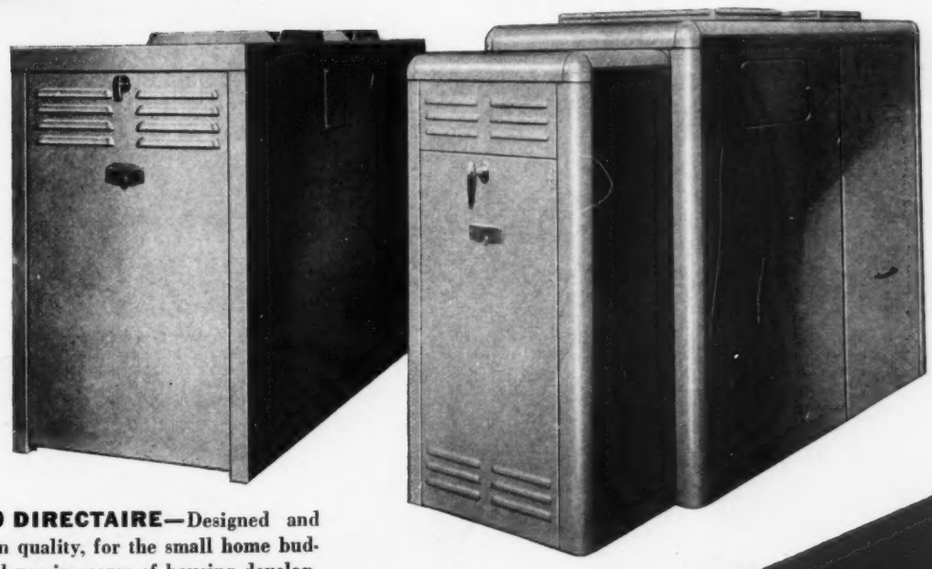

The **SPECIAL 80—120 DIRECTAIRE**—Designed and priced, without sacrifice in quality, for the small home budget. Already in successful use in scores of housing developments. Two sizes—80,000 to 120,000 Btu at the bonnet.

. . . and cover the entire comfort field

You are ready for anything, with this complete line of direct-fired conditioners behind you. Types for use with oil burner, gas burner, stoker—sizes and styles for *any* home, from the low-cost 5 or 6 room house to the elaborate, pretentious residence.

Not only that—you also have the name "FITZGIBBONS" to help you sell. Fifty-four years of continuous and successful experience in the supplying of economical domestic *comfort* is a powerful battering ram to knock down sales resistance.

Get set for 1940 with FITZGIBBONS. Check today—now—on the range of conditioners inclusive enough to take in every condition, every building budget. Mail the coupon for catalogs on FITZGIBBONS direct-fired conditioners. Keep this information handy for instant reference . . . add *punch* to your selling this coming year . . . *make it FITZGIBBONS in* '40!

See The FITZGIBBONS display at the HEATING & VENTILATING SHOW—CLEVELAND JANUARY 22-26

*Reg. U. S. Pat. Off.

FITZGIBBONS BOILER COMPANY, Inc. AA-1
101 Park Ave., New York, N. Y.
Send me catalogs describing the units I have checked.
Directaire ☐ Special 80—120 ☐
Name .....
Address .....

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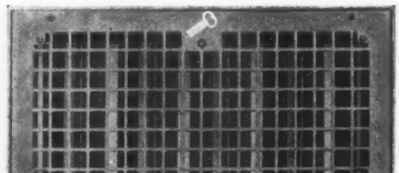

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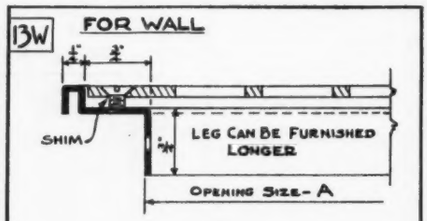

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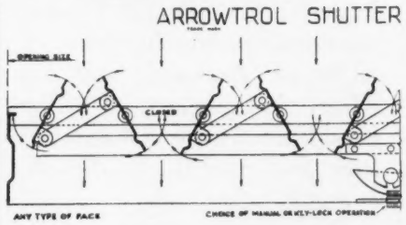

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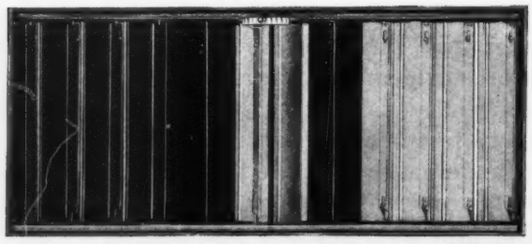

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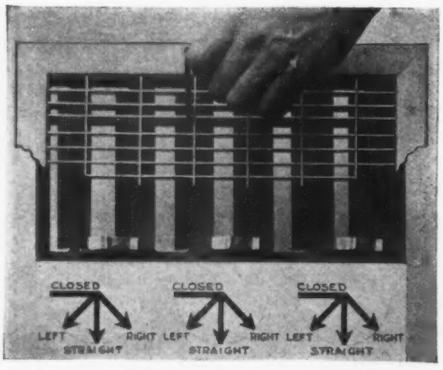

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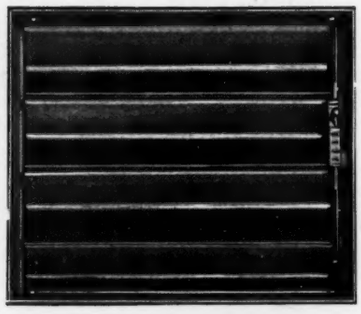

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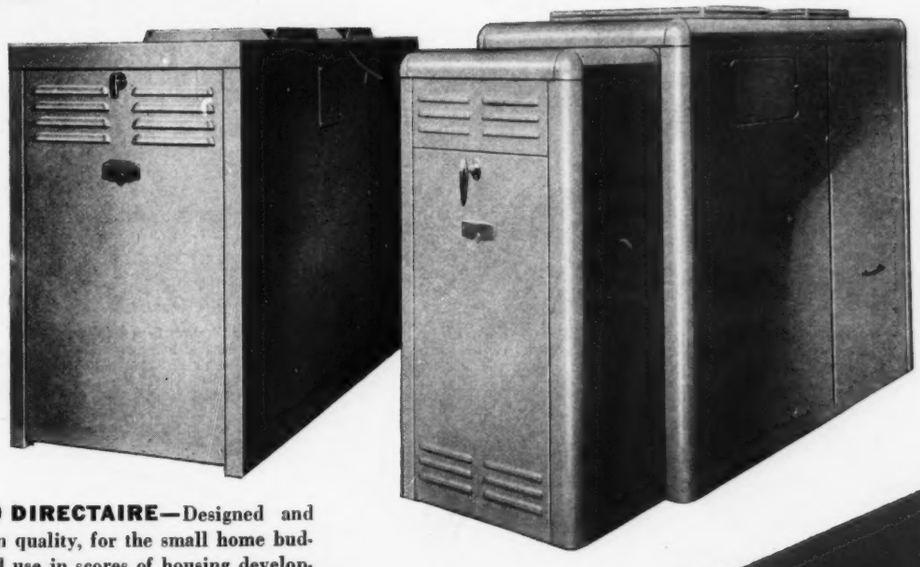

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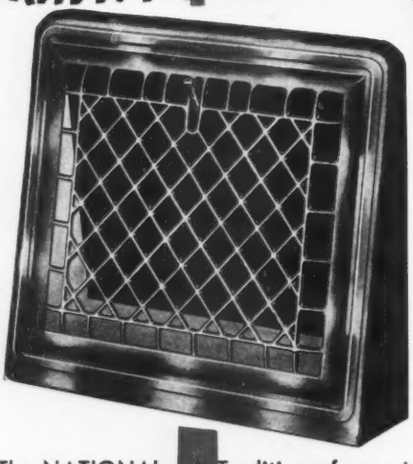
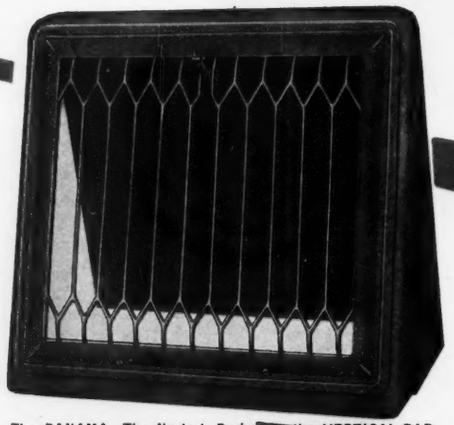
U.S. Tops Them All in Conditioning

GRAVITY BASEBOARD REGISTERS



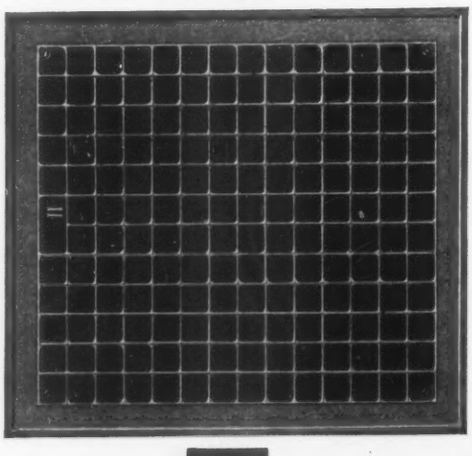
The NATIONAL—A Tradition of over two Decades. No Design Changes—The Original LEAK-PROOF Perfected Product in Gravity Baseboard Registers—Smooth Round Corners—Removable Centers with Turn-Lug Fastener—No Loose Screws.



The PANAMA—The Neatest Design of the VERTICAL-BAR TYPES. Spacing of Pinched-Bars affords [illegible] Capacity—Yet creates no objectionable Gaping Appearance. [illegible] Round Corners—Removable Centers with Turn-Lug Fasten[illegible] the PANAMA a Preference.

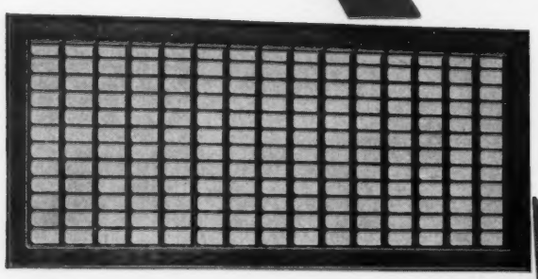
GRAVITY FLOOR REGISTERS

The No. 400 Trussteel Floor Register. 82% Free Area and Heel-Proof. Perfect Seamless Corners—Has No Equal.

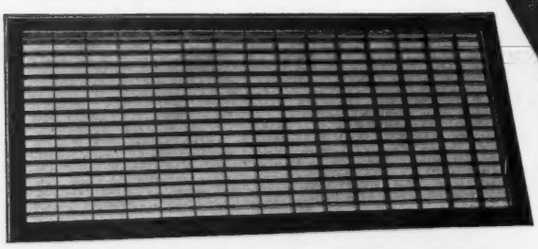


The No. 300—EMBOSSED STEEL FLOOR REGISTER—The ELITE of Floor Registers—STRONG—RETIRINGLY ATTRACTIVE. NEW REGISTER Body and Valve renders Greatest Ease of Movement and Operation regardless of Size.

GRAVITY COLD AIR FACES



The No. 305 U. S. Embossed Steel Face blends into any Surroundings. Supports spaced two inches apart develop the Strongest Type of Construction.



The No. 405 TRUSSTEEL FACE excels any other Similar Type. The Corners are Seamless—Show no miter—Spacing are perfect—Finishes are unequalled. Regular mesh is HEEL-PROOF. Also Furnished in Close Mesh

MEET US AT SPACE 444 at The International Heating and Ventilating Exposition in CLEVELAND

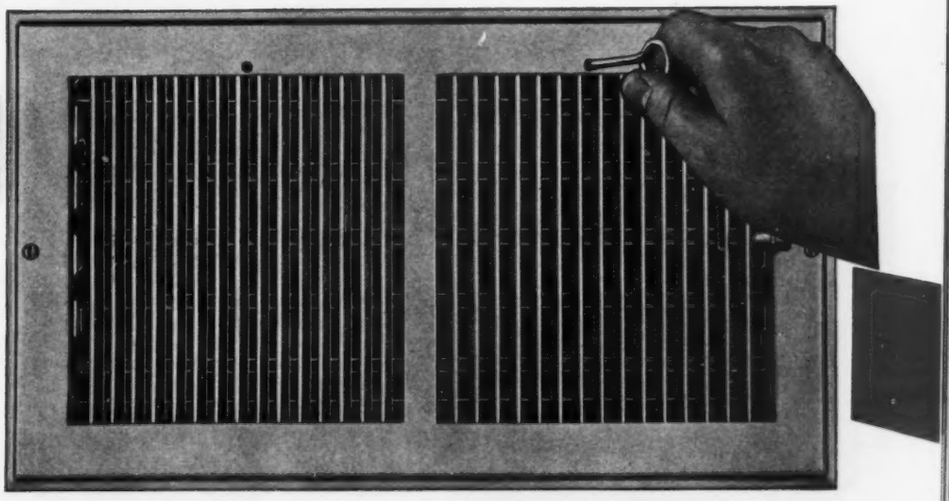
in the Gravity and Air-Register field.... AND A LINE FOR EVERY PRICE LEVEL

BIG Reduction in AIR-CONDITIONING REGISTER PRICES

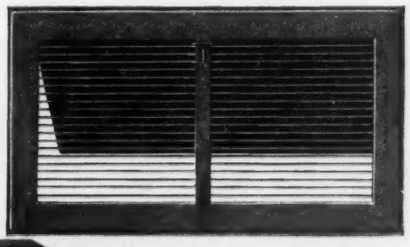
for Quality - Low Cost Directional - Flow Installations

NEW LOW LISTS

The No. 200 DUO-DEFLECTION LINE for DeLuxe Yet Economical Air Distribution

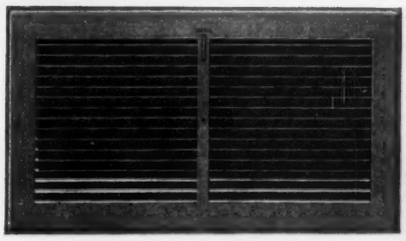


U. S. LOUVER-TYPE REGISTERS—Single Valve—PREVENT SOILED CEILINGS.



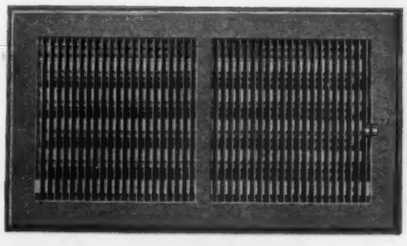
...Price Group (Fixed Deflection).

...ADJUSTABLE-BAR REGISTER—Single Valve —H... Vertical Bar Styles.



Low Price Group (Changeable Deflection).

U. S. VERTICAL FLEX-BAR REGISTER—Multiple Valve—Air-Flow to Right or Left changed by Flexible Grille Bars.

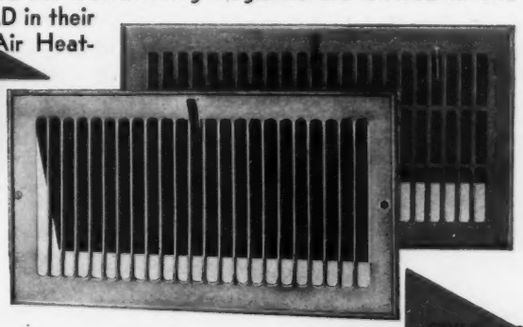


Low Price Group (Flexible-Bar Style).

We have the ANSWER To YOUR REGISTER PROBLEMS. We Advocate the U. S. LOUVER-TYPE Single Valve Style for ALL Classes of Quality Work. We offer a STANDARD LINE for any Class from the FINEST DELUXE to the LOWEST COST COMPETITIVE TYPE of Work.

YOU REALLY NEED LOOK NO FURTHER Than Our 1940 Set Up—It's Important to You

...Perforated Air-Conditioning Registers are offered in two Designs... LEAD in their Class of Forced Air Heating...



STYLE 102 Vertical Embossed-Bar—Single Valve.

STYLE ... Vertical Lattice—...

Send for Our Latest New Price Offering for 1940 and Catalog

UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

CANADIAN MANUFACTURING DISTRIBUTORS—Canada Register & Grille Co., Ltd., Toronto, Ontario

NIAGARA

Easy, smooth, quick operation, accurate work, ability to handle the new stainless and other alloys—you get them ALL with the complete line of Niagara Machines and Tools for sheet metal shops. There is the right size and type of machine to save time and material on every job. Write for catalog.

SQUARING SHEARS

For Easy Foot Operation

Easy foot operation makes them ideal for shops having no available power. Built with closed and gap housings. Cutting lengths from 22″ to 1120″. Complete with front, side, bevel and back gages. Write for Catalog 80-C.

COMBINATION BENCH MACHINES

No. 131 and 147 machines perform burring, turning, wiring and elbow edging operations — one machine with interchangeable rolls. All gears enclosed for fast operation with safety. Capacities 18 and 22 gage. Complete with bench standard, adjustable gage and wrench.

QUEEN CITY SHEARS

Niagara Queen City Shears widely used for straight line cuts for slitting and trimming sheets. Designed for easy foot operation. Equipment includes Niagara knives, front, bevel, side and back gages. 5 sizes from 22″ to 52″ cutting lengths . . . capacity 18 gage.

NO. 172 ELECTRIC COMBINATION MACHINE

Plugs into electric light socket for burring, turning, wiring, beading, crimping, elbow edging, slitting and other operations.

FOLDERS AND BRAKES

For bending and folding edges of sheets at various angles and for lock seams and joints,—also for round edges when wire is inserted. Operation is simple and quick. Various models of Niagara Bar Folders from 17″ to 60″ working lengths and Universal Folders and Brakes from 30″ to 60″ lengths.

SLIP ROLL FORMERS

For curving flat sheets into cylindrical forms for producing pipe, stacks, drums and container bodies. Right hand end of upper roll swings forward to permit removal of formed cylinder. Quick trigger operation unlocks, opens, closes and relocks upper roll. 30″ to 48″ working lengths.

← LEFT: UNIVERSAL ROTARY MACHINE for burring, turning, wiring, crimping and beading,—5 machines in 1. 24 gage capacity.

RIGHT: NIAGARA BAR FOLDER bends and folds in one operation. 6 sizes from 17″ to 60″ working lengths. 22 gage capacity. →

NIAGARA MACHINE & TOOL WORKS, BUFFALO, N. Y.

Branches: Leader Bldg., Cleveland, O. • General Motors Bldg., Detroit • 50 Church St., New York City

✓Check WITH MAJESTIC

for
✓Gas Fired
✓Oil Fired
✓Stoker Fired
✓Hand Fired

LEADERS IN QUALITY HEATING EQUIPMENT FOR OVER 36 YEARS

The **Majestic Line** gives you **EVERYTHING . . . QUALITY AND A COMPLETE LINE OF HEATING EQUIPMENT . . .** from the low-cost competitively priced hand fired steel furnace to the finest deluxe automatic winter air conditioner to be found. Heavy Duty Cast or Steel construction; gravity or forced air units; gas, oil or coal fired; manually or automatically controlled With the one line you can handle the small home or a 60 room fraternity house. But that is only one of the benefits **Majestic** affords! The efficiency, economy and lasting qualities of **Majestic Equipment** has been proved through the years. Present installations 10, 20, and 30 years old have won **Majestic** the reputation for quality . . . and that's true regardless of the price of the **Majestic** unit used. Also, as pioneers in the heating field **Majestic** has been responsible for many of the outstanding improvements that have been made in heating equipment. Leaders in design development! So when you install **Majestic** Equipment you can be sure of the satisfaction it will render your customer. By concentrating your efforts under the **"Majestic Banner"** you can cash-in on the reputation of a **QUALITY LINE** and simplify business operations through dealing with one source of supply.

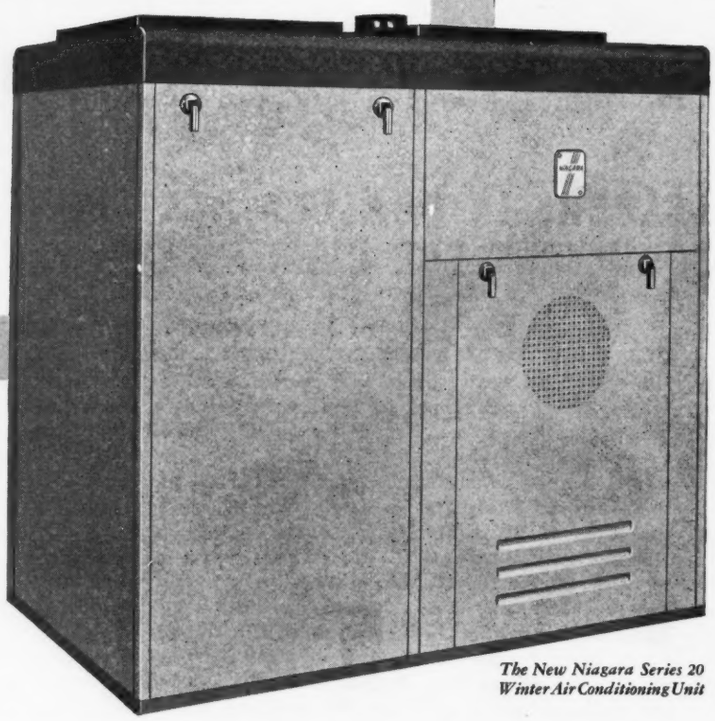
Write **TODAY** for details on our Dealer Franchise. Through our Planning Department, Dealer School and other cooperation, a **Majestic Dealer** has every facility available for building an efficient and highly profitable business.

A COMPLETE LINE FOR BETTER HEATING

The MAJESTIC COMPANY, HUNTINGTON, INDIANA

NIAGARA FURNACES

will be at the Show



The New Niagara Series 20 Winter Air Conditioning Unit

YES, sir!—Niagara will be at the show—Booths 23 and 25—with new units that you will want to know *all* about.

SEE The Restyled Niagara Series 20

Here's one of the most efficient, inexpensive and convenient gas-fired heating units available today. Thousands of home owners who have long wanted to enjoy the cleanliness and convenience of automatic gas heat will find their answer in the low-priced, economical Niagara Series 20.

New color—new finish of smooth Hammerloid enamel—and completely redesigned casings and hoods without any projections except handles produce a unit styled to the most beautiful of modern homes.

Winter Air Conditioning and Gravity Models

The Niagara Series 20 is presented to you in both winter air conditioning and gravity models. All features—including the Niagara combustion chamber of copper chrome alloy, Niagara copper chrome alloy heat exchanger—are identical in both models.

Every popular type of furnace is made by Niagara. Pay us a visit at the show—or if you cannot attend—write for complete information about coal, oil or gas-burning Niagara units equipped for gravity or forced air circulation.

GET ACQUAINTED WITH THESE NIAGARA FEATURES

Low Price ★ Fully Automatic Controls ★ Attractively Designed Cabinets ★ Concealed Burner Controls ★ Copper Chrome Combustion Chamber ★ High Heating Efficiency ★ Minimum Fuel Cost ★ Range of Blowers from one-speed belt drive to 5-speed direct drive ★ Summer-winter Switch (A.C. Models) ★ Wide Variety of Optional Control Equipment (A.C. Models) ★ Approved by American Gas Association.

ALSO ready for your approval will be displayed the *New Niagara Series 10 Winter Air Conditioning and Gravity Units with Toncon iron* combustion chamber and heat exchanger.

THE FOREST CITY FOUNDRIES CO.

2500 WEST 27th STREET • PHONE: PROSPECT 5040 • CLEVELAND, OHIO

Checkmate water

... with ★ YOUNGSTOWN GALVANIZED SHEETS

The old hot air furnace poured the atmosphere of the Sahara Desert into a house. But the modern winter air conditioning job is sweeping ahead because it brings healthful, life-giving moisture to home atmosphere. But along with the moisture comes corrosion trouble for the ducts and for you, too, unless you have installed well galvanized sheets.

That's why Youngstown has been exercising the greatest possible care in making Youngstown Galvanized Sheets. Where a pin hole in the zinc covering would spell trouble, Youngstown makes sure of complete zinc covering by thoroughly cleaning sheets before galvanizing and by passing sheets slowly and steadily through the galvanizing bath, inspecting every operation and ruthlessly discarding any sheet not up to the Youngstown standard.

When you put in a duct job, the workability of Youngstown Sheets will help you get a job in as planned -- and after the job is in, your reputation will be protected from kick-backs on quality of material. Youngstown Sheets help you make more money on each job -- and assure satisfied users which helps you get more jobs.

★

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes. 10-93

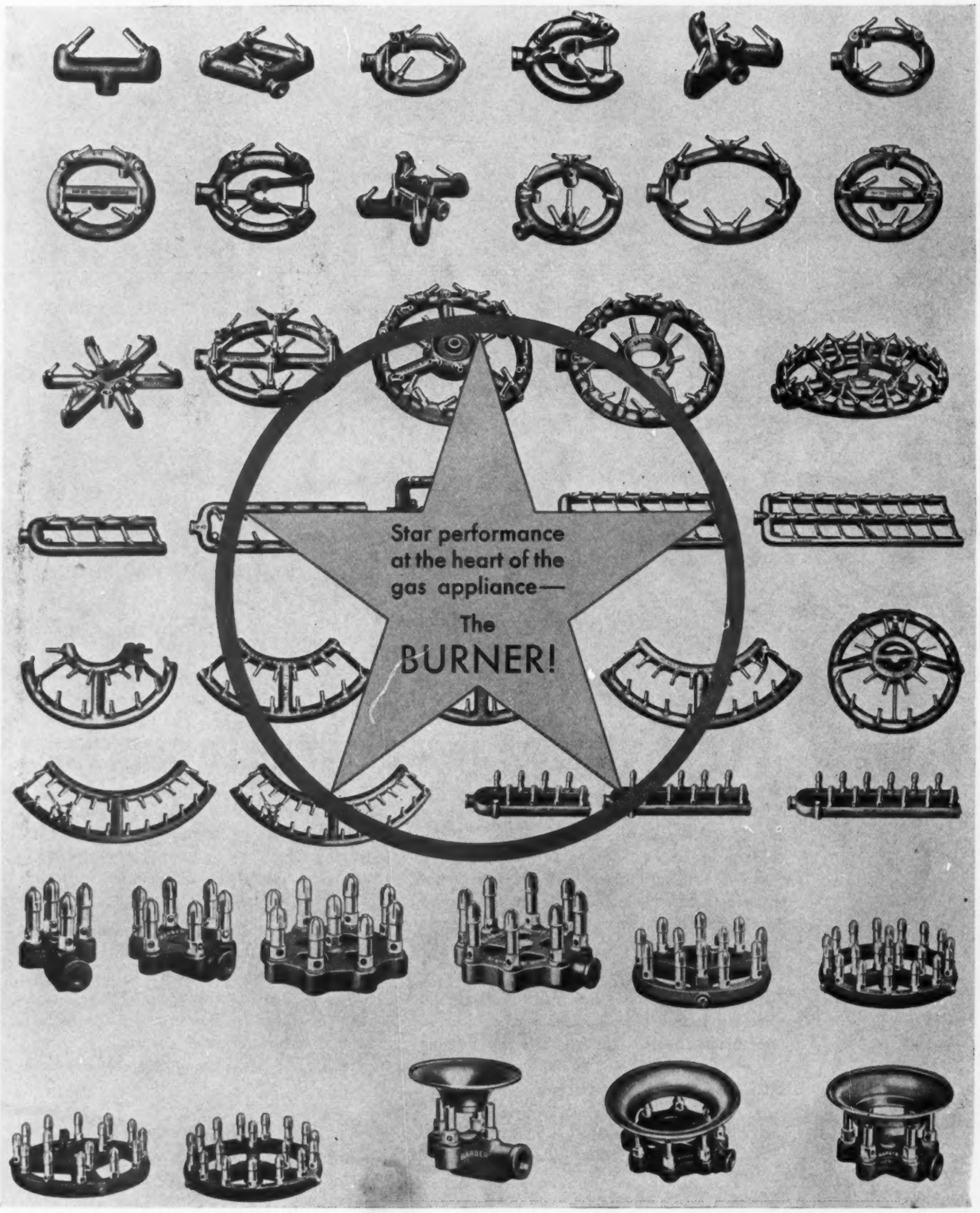
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

Burner Headquarters for the Gas Appliance Industry!

See the Barber Exhibit at the Heating & Ventilating Exposition, Cleveland, Jan. 22-26

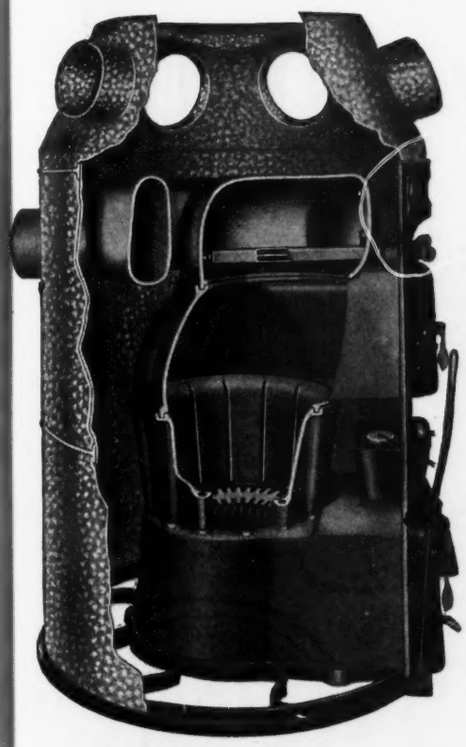


THE BARBER GAS BURNER COMPANY, 3704 Superior Avenue, Cleveland, Ohio

Address Michigan Inquiries to **The Barber Gas Burner Co. of Michigan, 4475 Cass Ave., Detroit**

BARBER *Automatic* JET GAS BURNERS

1940 ...another BIG year for WISE dealers



WISE SERIES "A"
GRAVITY FURNACE

WISE AIR CONDITIONING UNIT

The advent of 1940 means another year of opportunity for the wide-awake, aggressive dealer to further improve his trade and reputation by smart merchandising and consistent effort. We have any number of those men on our dealer list. Men who know from experience that the WISE Furnace line is their "best bet" toward increased profits and satisfactory installations. We've been making quality heating and air conditioning plants for well over a quarter of a century and it's a point of pride with us that we have been able to get and hold dealers who invariably turn their efforts into actual sales . . . profitable sales!

The Wise furnace is just the unit for such men. They know that once it is installed properly they won't be bothered with troublesome, expensive call-backs; that it will perform efficiently and economically for many, many seasons; that a handsome profit is theirs on each installation and that subsequent customer recommendations will help to substantially increase their business.

Illustrated at top is the famous WISE Series "A", Gravity Furnace featuring slipover fronts, ashpit and lower front in one solid piece, one piece cast base for both round or square casings, heavy one piece, absolutely self-cleaning radiator and air cell smoke consuming firepot. This is a truly great furnace . . . one that can be relied on to hold old customers; assist immeasurably in getting new ones.

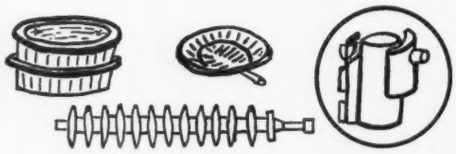
Also shown is the WISE Air Conditioning Unit. Attractively finished and modernly styled to fit right in with your customers' decorated basements. Substantial construction too, strong enough to stand the toughest winters with a minimum of fuel and a maximum of satisfaction.

Lay your plans now to make 1940 another BIG year. Investigate the Wise proposition. Literature on the complete line will be gladly sent on request. Write us today!

WISE FURNACE CO.

AKRON OHIO

WE HAVE EVERYTHING



DISTRIBUTORS OF

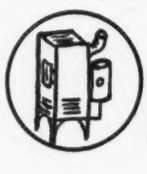
NORCO PRODUCTS:

Asbestos Paper and Cement
Ash Pans
Ash Pit Doors
Blowers
Boiler Repairs
Boiler Cleaning Compounds
Boiler Grates
Bonnets
Broiler Pans—All sizes
Brushes
Casing Collars
Cast Furnaces
Cement
C-I-C Enamel Cleaner
Circulators
Chain
Chimney Cleanouts
Chimney Tops
Clinker Tongs
Cook Stoves
Copper Furnace Coils
Dampers
Doughnut Stoves
Draft Adjusters
Draft Regulators
Elbows
Fans
Filters
Fireclay
Fireplace Dampers
Fireplace Equipment
Fireplace Grates
Fittings
Float Valves
Floor Registers
Flue Brushes
Flue Scrapers
Flue Stoppers
Forced Air Fittings
Furnace Brushes
Furnaces — (Norco Cast Steel, or Air Conditioning Unit)
Furnace Check Dampers
Furnace Cleaners
Furnace Pipe & Fittings (Angles, Elbows, Galvanized Tees)
Furnace Pokers
Furnace Regulator Accessories
Furnace Repairs
Furnace Slicer Bars
Furnace Tees
Gas Burners
Gas Cocks
Gas Ranges
Gas Range Repairs
Grilles
Heat Controls
Hot Water Coils
Hot Plates
Hot Water Thermometers
Humidifiers
Industrial Gas Burners
Kitchen Heaters
Kreuter Pliers
Laundry Stoves
Mica
Non-Con-Dux Asbestos Products
Norco Furnaces (Cast, Steel & Air Conditioning Unit)
Oil Circulators
Oil Stoves
Oil Stove Repairs
Paints
Porcelain Door Handles
Furnace Vacuum Cleaners
Pokers
Quadrants
Registers & Register Faces
Repairs for all Makes of Furnaces & Boilers
Shovels
Snips
Soot Destroyers
Springs and Clips
Spring Handles
Stove Boards
Steel Furnaces
Stove Cleaner
Stove Knobs
Stove Lid Lifters
Stovepipe Collars
Stovepipe Dampers
Stovepipe Elbows (Corrugated and Adjustable)
Stovepipe
Stovepipe Tees
Stovepipe Wire
Stove Pokers
Stove Polish
Stove Putty
Stove Repairs
Stove Shakers
Stove Urns
Tank Heaters
Tees
Tinners Red & Gray
Tinners Snips
Tin Fittings
Thermometers
Turpentine
Ventilators (Accurate)
Water Pan Fillers
Wire Drop Handles
Wicks
Wire

NORTHWESTERN STOVE REPAIR CO.

Manufacturers of Stove, Furnace and Boiler Repairs

662 WEST ROOSEVELT ROAD, CHICAGO, ILL.



JANITROL

IS DOING THINGS AND GOING PLACES!

JANITROL HAS "GADGETS" TO SHOW YOU AND NEWS TO TELL YOU ABOUT ITS BIGGER AND BETTER PLANS FOR 1940 THAT'RE MIGHTY INTERESTING TO EVERY DEALER LOOKING FOR "VELVET"

A BIG, GENEROUS FRANCHISE

The biggest news of the heating year is breaking around dealers who have investigated Janitrol's new profit-making franchise plan. They've already learned what it means to have the cooperation—products—and backing of the world's leading manufacturer of gas heating and winter air-conditioning equipment.

A TWO-FISTED DEALER PLAN

Of course one of the big reasons dealers are lining up under the Janitrol Franchise is because of the New Complete Business Building Program and Dealer Plan. It's complete in every way—advertising—merchandising—engineering—service—everything to get you away out in front ahead of competition and into real profits.

A BAG FULL OF NEW MERCHANDISING MAGIC

And these aren't all. There are special plans, special services—equipment, the most complete, most widely accepted line available. It costs you nothing to investigate—stop in and have a chat at the show or write us direct at the factory or to the district office in your locality. Don't forget—for 1940 it's Janitrol all the way.

FACE COMBUSTION CORPORATION • TOLEDO, OHIO

BRANCHES IN ALL PRINCIPAL CITIES

WE'LL BE SEEING YOU IN

BOOTH 247

INTERNATIONAL HEATING & VENTILATING EXPOSITION

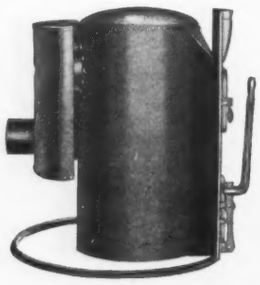
Cleveland

JAN. 22 TO 28

OU HAVEN'T SEEN THE SHOW 'TIL YOU'VE SEEN JANITROL!

EXCELSIOR WARM AIR HEATING EQUIPMENT

EXCELSIOR WARM AIR FURNACES—GRAVITY TYPE



APEX

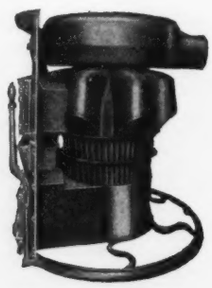
Steel. Three sizes, rated 461 to 683 sq. in. warm air pipe capacity. A high-grade Furnace priced extremely low.

ERA

Cast iron. Made in six sizes, rated 336 to 869 sq. in. warm air pipe capacity.

SUPERLIFE

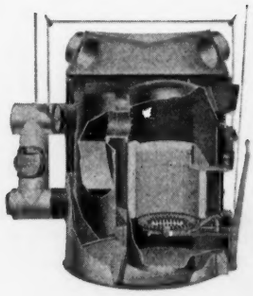
Chrome-alloy cast iron of similar design with 20 year guarantee.



FAMOUS

Cast iron. Made in three sizes, rated 595 to 843 sq. in. warm air pipe capacity.

Greatly increased heat radiating surfaces.



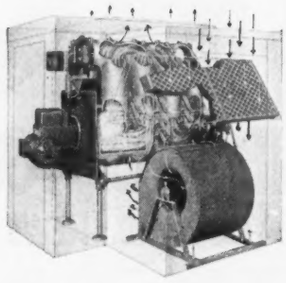
TOP-NOTCH

Steel. Six sizes, rated 464 to 1217 sq. in. warm air pipe capacity. The very latest in steel furnace design.

EXCELSIOR AIR CONDITIONING UNITS

APEX EXL-AIR

Attractively cased with blower housing on either side. Made in three sizes, rated from 83,500 to 124,000 Btu. and 800 to 2500 CFM. Steel construction. Economical in operation.



UNIQUE OIL BURNING AIR CONDITIONER

Cast iron Heating Element provides greater radiating surfaces with increased heating efficiency.

Made in four sizes:

B0—100,000 Btu.
800 to 2100 CFM.

B1—121,000 Btu.
1220 to 2500 CFM.

B2—141,000 Btu.
1220 to 2500 CFM.

B3—161,000 Btu.
1100 to 3200 CFM.

Unequalled for economy, heating efficiency and quietness.

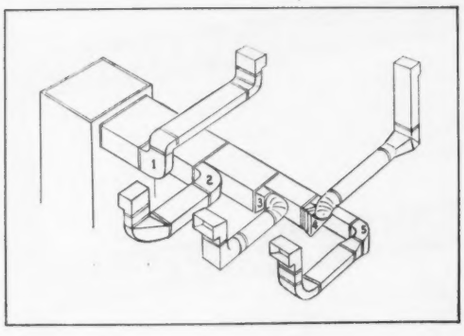
TOP NOTCH EXL-AIR

Complete winter air conditioning unit. Three sizes, rated from 98,000 to 141,300 Btu. and 800 to 2500 CFM. Casing is fully baffled for uniform heating.

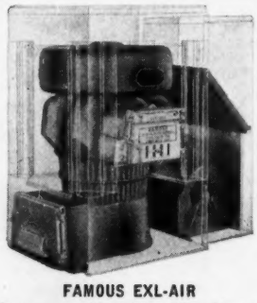
EXCELSIOR PREFABRICATED FORCED AIR DUCTS AND FITTINGS

APEX OIL BURNING UNIT

Standard burner in specially designed steel heater. Three sizes rated at 93,000 to 142,000 Btu. Cast iron combustion chamber, refractory lined, simplifies installation.



A simplified duct system for forced air and air conditioning installations. Our No. 7 catalog, with our combined Code and Manual explain the ease with which Trunks and branches can be designed and installed.



FAMOUS EXL-AIR

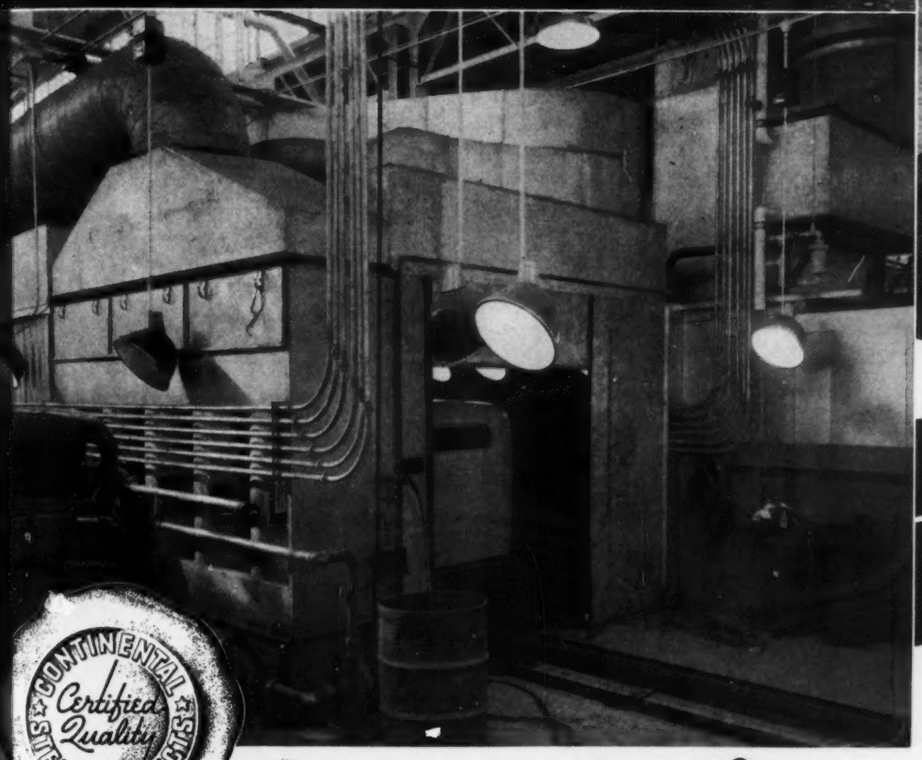
Square cased Units with blower, blower switch and automatic humidifier. Made in three sizes, rated from 111,600 to 158,700 Btu. and 800 to 3200 CFM.

Standard model permits side stoker installation.

Complete Information on All of the Above Products Upon Request

THE EXCELSIOR STEEL FURNACE CO.

118 S. CLINTON ST. CHICAGO, ILL.



CONTINENTAL ★ Certified Quality ★ STEEL PRODUCTS

Certified Quality ADDS PERMANENT VALUE TO SHEET METAL CONSTRUCTION

In sheet metal work, quality begins with the material used. It starts with the charging of the melting furnace, the rolling and the coating of the sheets. Here is where the uniform temper and gauge of Superior sheets is made sure. Here is where the Superior galvanizing process makes certain the uniformity of the coating—adhesion, pattern of spangle, and shade. It is the extra care taken all the way along the line in the production of Superior sheets that gives you added assurance of a good job. That's the meaning of Superior Certified Quality.

All Superior Galvanized sheets are made under Certified Quality standards. Every step in their making, from the metallurgical stage to the final packing, is under control of experts in their line. Every element of quality is personally certified by these men. This added care in production adds to the value of every job, large or small, in which Superior Galvanized sheets are used.

THE SUPERIOR SHEET STEEL CO., Canton, Ohio
Division of Continental Steel Corp., U. S. A.

SUPERIOR

OPEN HEARTH STEEL SHEETS

"HOME COMFORT"

The Grand Prize Line

1000 Series Steel
"HOME COMFORT"
CRESCENT

"HOME COMFORT"
Oil Fired Steel A. C. Unit

500 Series Steel
"HOME COMFORT" CRESCENT

1100 Series Steel
"HOME COMFORT"
TUBULAR

"HOME COMFORT"
Gas Fired Steel A. C. Unit

"HOME COMFORT"
DUR-A-BLE Cast Iron
Furnace

Forty's Finest

No more need be said about the "HOME COMFORT" line of heating and winter air conditioning equipment for 1940. Even before the so-called "Gay Nineties" "HOME COMFORT" was recognized as one of the finest lines of heating equipment made. From the acceptance of "HOME COMFORT" air conditioning units during the past few years, we have every reason to believe the "Roaring Forties" will be even more outstanding.

Start 1940 right . . . tie up with a line of proven merit—Sell "HOME COMFORT" in every sense of the word, and give your own reputation and years of experience a boost by selling "Forty's Finest" in heating and air conditioning units.

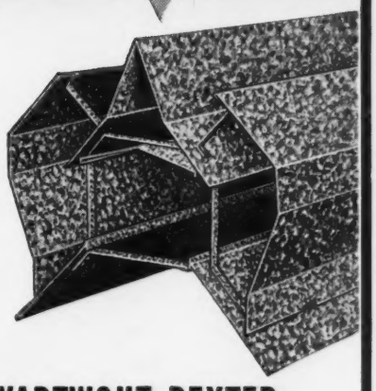
ST. LOUIS FURNACE MANUFACTURING CO

2901-11 ELLIOT AVENUE • • • ST. LOUIS, MO

Cash in on the demand for Better Ventilation with the customer-pleasing

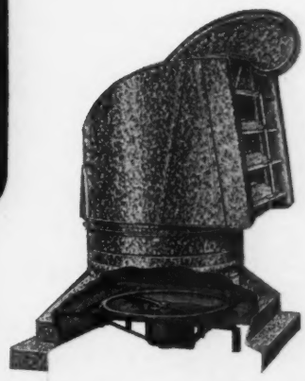
THIS YEAR promises new opportunities for you to make profits in ventilating jobs. You can take special pride in the installations you make with nationally known Swartwout Ventilators. Satisfied customers call you for more work and you avoid complaints and adjustments that cost you money. It's profitable to install Swartwout Ventilators with their advanced design, special construction features, ease of erection. These three outstanding styles meet every ventilation requirement.

SWARTWOUT *Quality Three* VENTILATORS



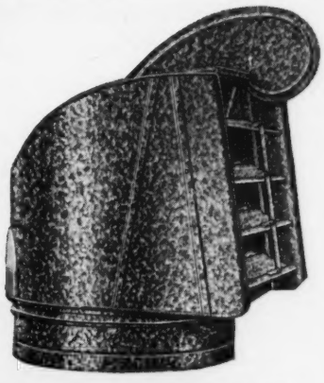
SWARTWOUT-DEXTER HEAT VALVE

The original continuous roof ventilator. Large capacity per square foot of opening because of minimum friction and strong suction effect. Easily installed—full length of building or intermittently—on peak or flat roof. Especially effective where excessive heat, smoke or fumes are present. Enhances the appearance of any building.



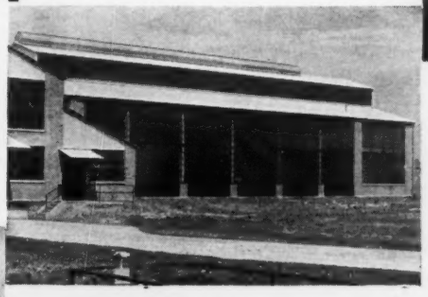
SWARTWOUT AIRJECTOR

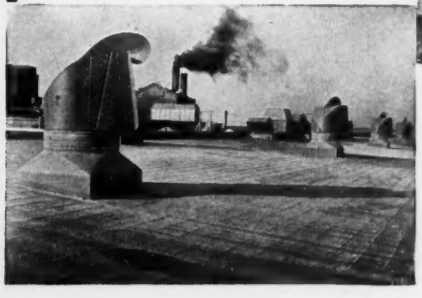
Here's the last word in roof ventilation—rotary type plus power, and used either with power or without as conditions require. Discharge is always with the wind, cuts static resistance to almost nothing. Airplane type propeller fan provides greater capacity for power consumed—economical to operate, low upkeep cost. Ideal for use wherever power ventilation is required.



SWARTWOUT ROTARY

The old stand-by roof ventilator with new design—new efficiency. Dust-tight stainless steel ball bearings, permanently lubricated; welded tube frame—strong and rigid; outside louvre dampers. New curved body, pleasing in appearance. A powerful gravity ventilator for all general ventilation purposes.





Contractors *are installing thousands of Swartwout Ventilators all over the country. Send now for full information on this Swartwout QUALITY THREE!*

THE SWARTWOUT CO.
18615 Euclid Ave • Cleveland, Ohio

Swartwout
VENTILATION SPECIALISTS

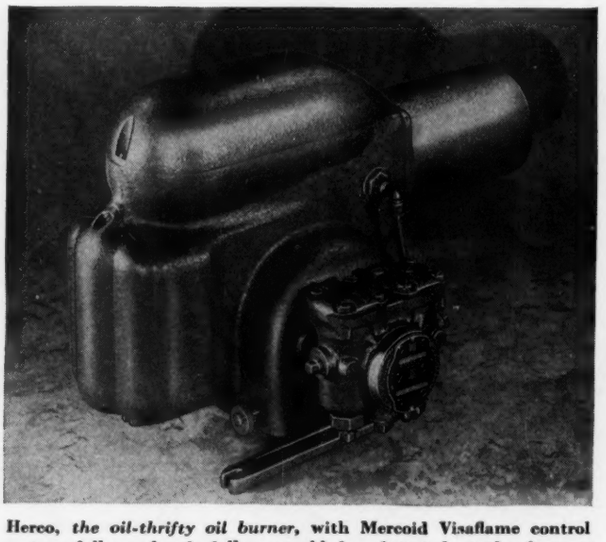
HERCO *leads the way...* with Mercoid VISAFLAME

Sectional view showing compact, practical mounting (patent applied for) of Visaflame, the modern light actuated control, directly on the transformer.

RECOGNIZING the need for a positive control which could be installed as an integral part of the burner, Herco engineers welcomed the new Visaflame control and have built it compactly into the famous Herco Oil Burner.

Visaflame is actuated by the light of the flame, and positive operation of the burner is not dependent on stack temperatures. Herco's exclusive method of mounting Visaflame directly on the transformer, inside the burner, provides ready accessibility to the complete ignition head assembly.

Shows how top plate can be removed and the entire transformer, with Visaflame attached, swings back to give ready access for removal of any part of the assembly. Note the fully enclosed wiring between Visaflame bulb and relay panel.



Herco, *the oil-thrifty oil burner*, with Mercoid Visaflame control system fully enclosed—fully assembled and tested at the factory. Made in the following sizes: ¾ to 1¾ gal. per hour; 1 to 3 gal. per hour; 4 to 8 gal. per hour.

SEE HERCO AT THE HOTEL CLEVELAND

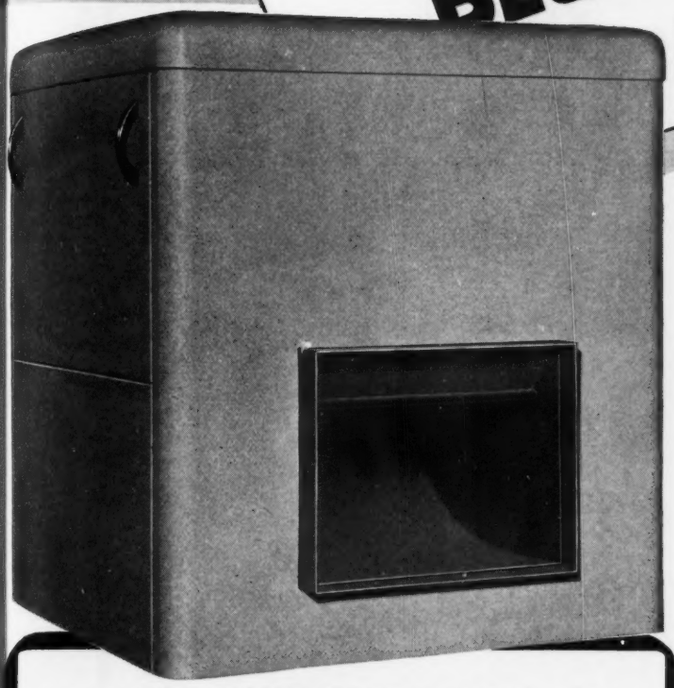
Herco Oil Burners, equipped with Mercoid Visaflame will be on exhibit at the Hotel Cleveland, January 22 to 26. See them when you go to the 6th International Heating & Ventilating Exposition.

Herco Oil Burner Corp., Lancaster, Pa.

U.S. AIRCO Air Conditioning EQUIPMENT

Significant New 1940 BLOWER FILTER UNIT

Packed with **VALUE** at no extra cost!

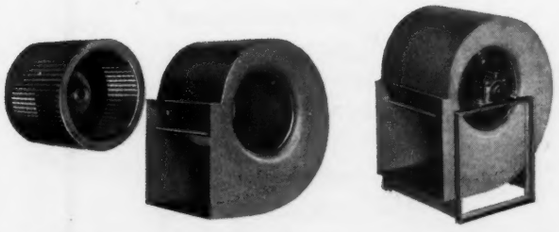


IT'S A BEAUTY!

The New 1940 U.S. Airco Blower Filter Unit boasts a full metal, sound insulated floor. Two side-access doors, one on each side, replace the old rear entry. Two doors means greater convenience for filter changing and oiling motors. In Summer it means more night-air cooling. The filter capacity is greater – more efficient. A simple-locking device holds each filter in place. The motor is hinged and rubber-mounted. Nationally known motor, Furnacestat and Vari-pitch drive included. Available in six sizes. U.S. Airco's a beauty! – all rounded corners, streamlined design, baked enamel finish. See U.S. Airco, the modern beauty – and the most efficient unit on the market.

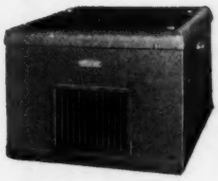
YOU CAN MAKE MORE PROFIT AND DELIVER GREATER VALUE WITH

USAIRCO EQUIPMENT



WHEELS AND HOUSINGS

LIGHT DUTY ASSEMBLIES



COLD WATER COIL UNITS

SANIDAIRE

WRITE FOR SPECIAL CATALOG

For complete data – for a careful consideration of each construction detail, write for Special Catalog. Get the complete picture of 1940's biggest blower-filter value.

FOR SUMMER PROFITS

Sell

USAIRCO EVAPORATIVE COOLING

Package Units, for stores, cafes, beauty shops, etc. that clean, wash, cool and filter 100% fresh air. Five sizes. Capacities 2500 to 10,000 C.F.M. The most economical cooling on the market. Effective temperature reductions 10 to 15 degrees. Evaporative Cooling offers the biggest buy in Air Conditioning for the average business. Evaporative Cooling is in full stride. It means big Summer profits for you. Write for details.

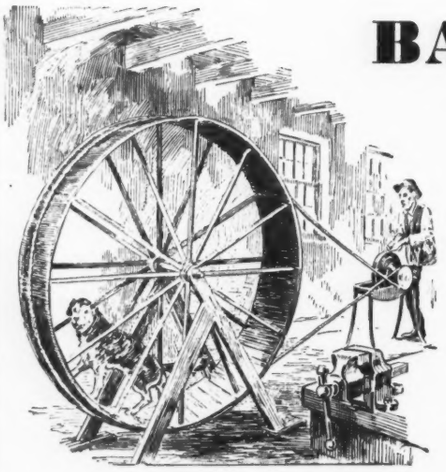
U.S. AIRCO Air Conditioning EQUIPMENT

UNITED STATES AIR CONDITIONING CORPORATION

Northwestern Terminal – Minneapolis, Minnesota

Export: U.S. Air Conditioning International, Inc., Graybar Bldg., New York. Canada: Canadian Air Conditioning Co., Ltd., 139 Queen St., West, Toronto, Canada.

WISS *Famous Since 1848....*



BACK in 1848

The Celebrated Wiss Snips were forged by hand in Newark, New Jersey, by the founder of the Company, Jacob Wiss, and sharpened on a grinding stone driven by a dog power tread mill. So well were these snips made that some of them were still in use after a half century of service.

1940

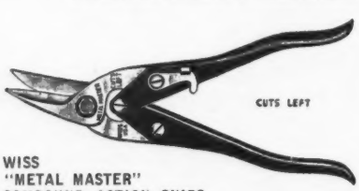
Today the factories of J. Wiss & Sons Co., are the largest of their kind in the world—the principal reason for their growth being firm adherence to the policy of the original Jacob Wiss—to only turn out goods of the highest quality.

TODAY — WISS SNIPS ARE KNOWN THE WORLD OVER

—Best by Actual Test—

PRECISION GROUND—ACCURATELY TEMPERED—FACTORY TESTED

"HIGH-POWER" SNIPS WILL CUT TOUGH ALLOY METALS



WISS "METAL MASTER" COMPOUND ACTION SNIPS

BULLDOG SNIPS

WISS SCROLL-PIVOTER SNIPS

Wiss "High Power" Snips

REGULAR PATTERN

COMBINATION PATTERN

CURVED BLADE PATTERN

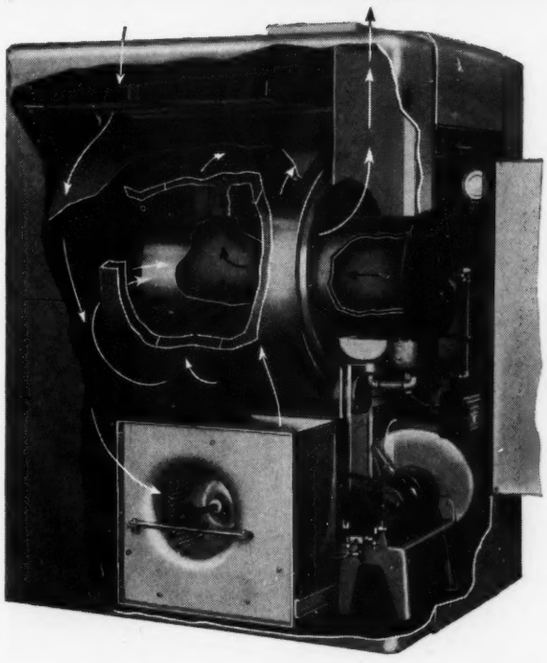
SEND FOR PARTICULARS OF COMPLETE LINE OF TINNERS' SNIPS

J. WISS & SONS CO.
NEWARK . . . . N. J.

The Complete Quality Line

SNIPS

For 80% of all home heating jobs



NORGE

presents the

NEW MODEL 120

OIL or GAS

WINTER AIR CONDITIONER

Here is a unit that meets the B.T.U. output needs of 80% of all residential work—and fits the budgets too. Easy to sell because it is low-priced and jam-packed with big sales features—including important Norge "exclusives."

In average installations no "on the job" engineering is needed. Mechanical draft automatically solves chimney and combustion problems. Long Fire Tunnel and 17-foot Spiral Flue blanketed in circulating air gives exceptionally high heat transfer, and these and other features result in 83% to 88% efficiency. Low fuel cost keeps users happy. Overall simplicity, performance, style, salability have made hundreds of contractors say "The Greatest Heating Unit I've Ever Seen." Send for literature.

A Great Unit...backed by a famous name and jam-packed with BIG Sales Features

- Low First Cost
- Quick Set-up, 2 to 3 hours
- Complete Factory Wired
- Mechanical Draft
- No Chimney Problem
- Automatic Safety Ignition
- Fully Automatic Controls
- Horizontal Fire Tunnel
- 17-Foot Spiral Flue
- Forced Air Circulation
- Quiet Blower
- Efficient Air Filtering
- Ample Humidity
- 120,000 B.T.U. Output
- Automatic Filter By-Pass
- Filter Change Indicator
- Single Motor
- Exceptional economy —83% to 88% efficiency with oil or gas
- Basement or Utility Room Installation

Mail this coupon for COMPLETE FACTS

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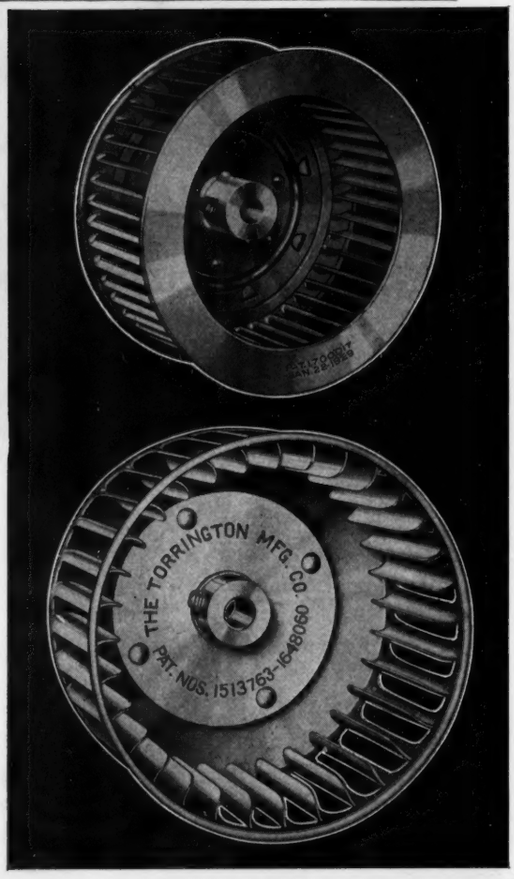
RUSH me literature and information about the Model 120 Winter Air Conditioner. No obligation, of course.

*Name*_____

*Address*_____

*City*_____ *State*_____

See the NORGE Model 120 at the Cleveland Show, January 22. Space 433



PERFECT balance and precise structural uniformity are the inherent attributes in TORRINGTON Blower Wheels which produce the smooth, quiet PERFORMANCE which the public demands. Correctly designed by experienced engineers, they are efficient. Tested in our own laboratory, all ratings are guaranteed. Consult TORRINGTON for trustworthy advice on fan problems. Blower Wheels 3″ to 16″ diameters, either single or double inlet. Propeller Fan Blades 3″ to 48″ diameters in a variety of pitches.

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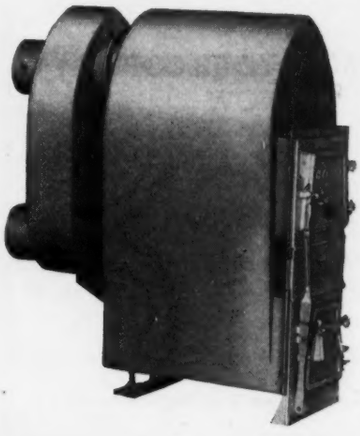
50 YEARS OF EXPERIENCE

THE Heat Wave FarQuar furnace is the result of over 50 years' experience in the manufacture of quality heating equipment.

In this model we have overcome many of the criticisms of the ordinary steel furnace.

1. Arch top to avoid top surfaces and add strength.
2. Sits 4" off the floor to allow air passage under furnace and keep away from floor dampness.
3. Only one outside joint in collar between firebox and radiator. This connection is lined with high quality refractory.
4. Locomotive type grates with short span and waist high shaker.
5. The connections between welded steel pouch, cast door frames and casing, are designed to eliminate any possibility of leakage of dirt back into casing.
6. Direct and indirect draft radiator, cast iron baffles, and scientific tear drop design.
7. Welded steel construction throughout.
8. Square casing finished in black crinkle baked enamel with aluminum finish hood. Not a round furnace with square casing, but both furnace and casing designed together.



9. We know of no heavier steel furnace, it weighs 30% more than the average.
10. Made in gravity and forced air models in five sizes.
11. Has the appearance and weight of a high priced furnace, but the dealer cost is in line with other good steel furnaces.
12. Easily and conveniently stokered from front or either side.

HEAT WAVE
COAL and COKE FURNACE

Our regular horizontal FarQuar Self-Regulating steel furnace continues to sell to the quality buyers. Our new modern oil furnace completes our line.

If you are interested in selling something distinctive, something different, a furnace that you do not have to sell at a competitive price, you will write us for catalogue.

THE FARQUHAR FURNACE CO.
BOX 471 **WILMINGTON, OHIO**

A NEW—AND BETTER—GUIDE

1940 EDITION

OLD DATA REVISED—NEW DATA ADDED

Catalog Data Entirely Re-Arranged

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8. Cooling Load
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10. Chimneys and Draft Calculations
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15. Steam Heating Systems
16. Piping for Steam Heating Systems
17. Hot Water Heating Systems and Piping
18. Pipe, Fittings, Welding
19. Gravity Warm Air Furnace Systems
20. Mechanical Warm Air Furnace Systems
21. Central Systems for Comfort Air Conditioning
22. Unit Heaters, Unit Ventilators, Unit Humidifiers
23. Unit Air Conditioners, Cooling Units, Attic Fans
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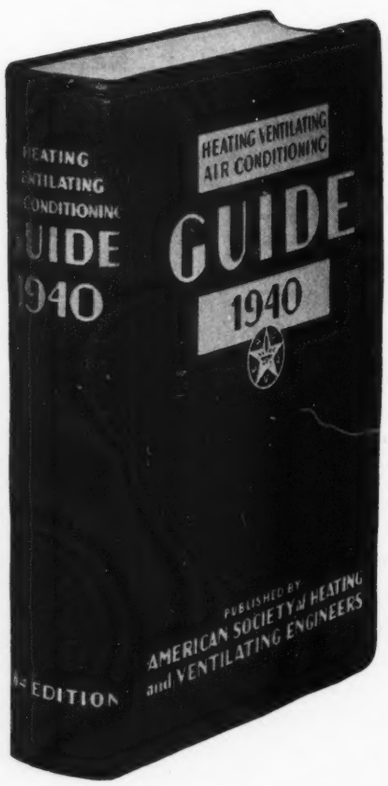

ENGINEERS use it to make designs and write specifications.

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CONTRACTORS find it useful in estimating costs and planning work.

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1 OIL-FIRED UNITS Air conditioning furnaces and boiler-burner units in all sizes for all tyes of homes. With pressure atomizing oil burner or built-in wall-flame burner.

2 GAS-FIRED UNITS Air conditioning units and gravity furnaces for manufactured, mixed and natural gas. In a wide range of models and sizes for small or large homes.

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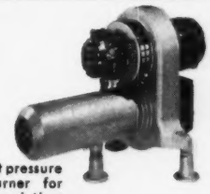
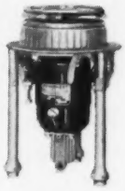


Above. Toridheet pressure atomizing oil burner for installation in existing heating plants. Available in two models for oil firing of air conditioning furnaces and boiler-burner units. Cuts cost of home heating.



Right. Toridheet wall-flame oil burner for "conversion" installation. Available for oil firing of air conditioning units and boiler-burner units. Burner built into units at factory—no installation experience required.

Left. Toridheet package-unit, automatic oil-fired water heater with built-in wall-flame oil burner. Nothing to do but hook it up to water, oil and power lines. World's most economical water heater.

YOU'RE in business to make a profit. You sell heating equipment for all three fuels in an attempt to satisfy all types of buyers. You sell furnaces for oil, gas and coal because you want to make your profit volume as high as possible.

What do you do when you get a customer who wants the type of heating plant you can't supply? Suppose that customer wants an air conditioning unit with a rotary wall-flame oil burner—can you supply it? Sure, you'll try to sell something "just as good" and, nine times out of ten, you'll lose the sale.

Why not handle a line of heating equipment that will help you get a greater percentage of sales . . . that will help you increase the size of your profit figures. Why not handle the *only* complete line in the industry?

Toridheet—heating pioneer—is proud to present to you a distinguished family of the most beautiful and amazingly efficient furnaces and air conditioning units in the world. Styled by sales experts, engineered by acknowledged authorities, these heating plants are the sensation of heating history.

Toridheet gives you *all three*—and more. Furnaces and air conditioning units for oil, gas and coal . . . boiler-burner units . . . rotary wall-flame and pressure atomizing oil burners . . . water heaters.

Avoid grief and guesswork. Build volume-profits and prestige with Toridheet—the line that has *everything*. But start TODAY! Send the coupon or write at once.

SEE AND COMPARE THE TORIDHEET LINE AT THE HEATING & VENTILATING EXPOSITION, JANUARY 22 TO 26

Visit us in Booths 839 to 843 . . . join us in a trip through the Toridheet plant . . . make yourself at home in CSP headquarters, Auditorium Hotel.

IT'S BETTER BUSINESS TO SELL TORIDHEET

. . . because the Toridheet franchise includes: (1) a complete line of heating equipment (2) a practical sales program to make your daily work successful (3) a greater net profit (4) close factory co-operation by experienced field men (5) exclusive features of engineering design and construction. In addition, we never forget our guarantee, our responsibility, and the assistance to which you are entitled as a Toridheet dealer.

View of Plant No. 1 at Cleveland, Ohio. Over 32 years of engineering experience and precision manufacturing guarantee Toridheet products made in two modern factories.

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TORIDHEET DIVISION
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CLEVELAND STEEL PRODUCTS CORPORATION
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COPPER
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IRON

• Comparative prices of ferrous materials, whether pipe, sheets, plates or some other form, must always be considered, because the material that may theoretically best answer the purpose may be prohibitive from an economic viewpoint.

But Toncan Iron, used where we recommend it, is not prohibitive. Quite the contrary,—it is an investment.

Consider first what Toncan Iron is—an alloy of refined open-hearth iron, copper and molybdenum. Because of its alloy content, it has a higher resistance to corrosion than any other ferrous material in its price class.

Consider the types of service where it has outlasted other ferrous metals — in boiler blow-off lines, on the roofs of railroad cars, in mine cars, in casing for wells supplying sulphur-laden water, in steam lines buried in cinders, in lines aboard ship, in vent stacks of railroad round houses, in railing exposed to salt air and spray.

Consider its longer life in almost every type of service. Its lowering of replacement and maintenance costs is something, too, that should be taken into consideration. Also, the fact that fabrication can often be accomplished in less time, because it is a ductile metal and one that can be cut, bent, formed and welded easily in sheet and plate form and cut and threaded readily in pipe.

All these things enter into the consideration of the most economical ferrous metal for a specific application—and if you keep them in mind, you will agree that the slightly higher price of Toncan Iron not only is not prohibitive, but clearly justified.

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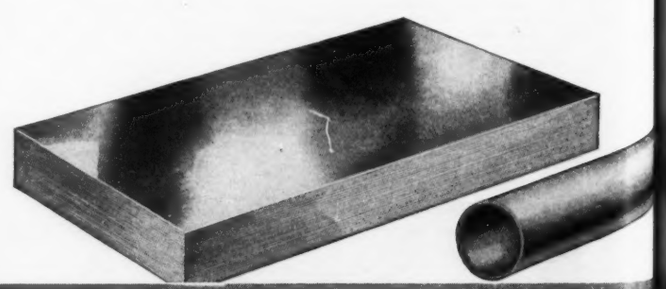


TONCAN IRON

An alloy of refined open-hearth iron, copper and molybdenum
—that grows old slowly

AMERICAN ARTISAN

Volume 109 Number 1

1939—Climax To a Hectic Decade

THE biggest news, without much question, for the warm air heating-sheet metal contracting industry for 1939 was the large increase in home building. 1939, as a year, more than fulfilled the predictions made one year ago.

If reports from contractors are any indication, 1939 was the busiest year in warm air heating since the last building boom. It was predicted a year ago that 1939 would see a tremendous increase in home construction, especially in small, low cost houses. Home building began to pick up last summer and approached boom proportions in many communities during the late Summer and Fall. In many communities, according to reports, building continued without appreciable slackening up to the holidays.

Conditions Favor Home Building

Several things probably contributed to this building increase. There seemed, last year, to be a noticeable trend by families to put their money into tangible savings. All during 1939 the home financing market was more than usually active—the number of institutions offering financing plans under FHA increased and institutions already offering loans under the plan invited larger numbers of borrowers. There was, too, a concerted publicity campaign by financial institutions, building material manufacturers and dealers and the Federal agencies to interest prospective home builders to build now.

The increasing employment; men long idle returning to jobs; more substantial incomes and steadier employment more than offset fear caused by troublesome times abroad, increasing costs of living and other factors which might have curtailed building.

Warm Air Heating Trends

Of direct interest during 1939 was the accelerated pace at which warm air heating moved toward trends predicted one and two years ago. Houses of smaller size and lower cost sharply increased sales of heating equipment in the 75,000 to 100,000 Btu output bracket. At the same time the use of more insulation, storm sash, weather-stripping, etc., coupled with smaller size, made automatic heating more attractive. Families building or buying smaller, better constructed houses, were willing to pay for automatic heat when the total year's heating bill did not equal the heating bill by hand firing of the older, larger homes.

In compiling the 1940 Directory it was found that the number of manufacturers offering gas fired furnaces doubled; oil furnaces without and with burner increased sharply; furnaces designed especially for stoker application increased. This indicates that the field of automatic firing is pacing the increase in residential building.

As everyone in the warm air heating business knows, the public has now come to demand—not just to appreciate—the advantages of winter air conditioning. With FHA strongly recommending winter air conditioning in all houses costing $5,000 or more and with the remodeling market swinging definitely to winter air conditioning in replacement, the future of this market seems assured.

Sheet Metal Changes

In sheet metal work, there were not as many large public buildings let to contract or completed in 1939 as in former years, but buildings constructed showed a trend to better materials, better application of all materials and equipment and closer attention to measures which make for long, maintenance-free building life. Some of the public and semi-public buildings completed in 1939 were unusually interesting from the viewpoint of ventilation, air conditioning and roofing.

Sheet metal contractors, in general, probably had little difficulty in "making their overhead." Some firms, we know, which counted heavily on commercial air conditioning as a source of work were disappointed in the volume let to contract and in the prices obtained for sheet metal fabrication. That the low price situation will better in 1940 seems, we believe, to depend upon future volume. When and if all contractors get busy, prices will rise. So long as there are many "hungry" contractors, prices will remain low.

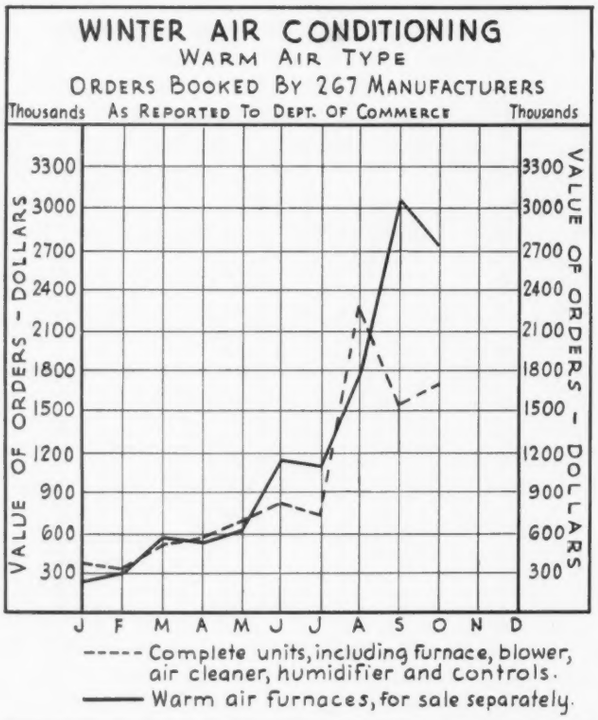
Because of low prices, intense competition, small volume in architectural sheet metal, many sheet metal shops, power-equipped, gave attention in 1939 to the possibilities lying in the fabrication of sheet metal specialties. There seems to be an inclination on the part of metal specialty buyers to seri-

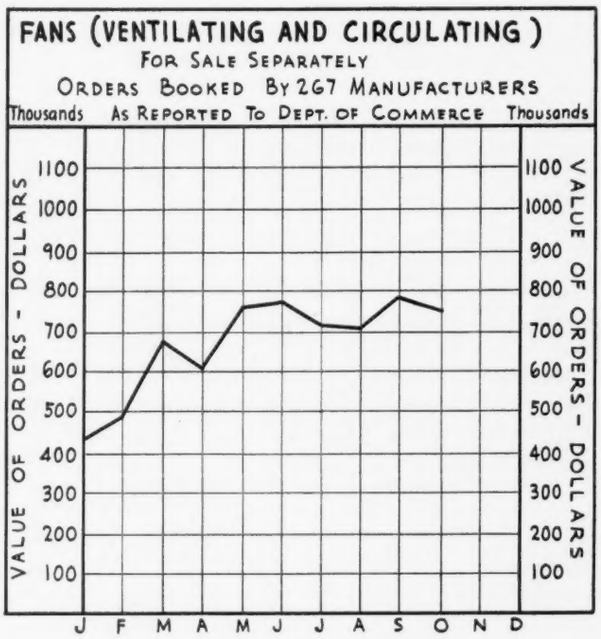
(*Continued on page* 200)

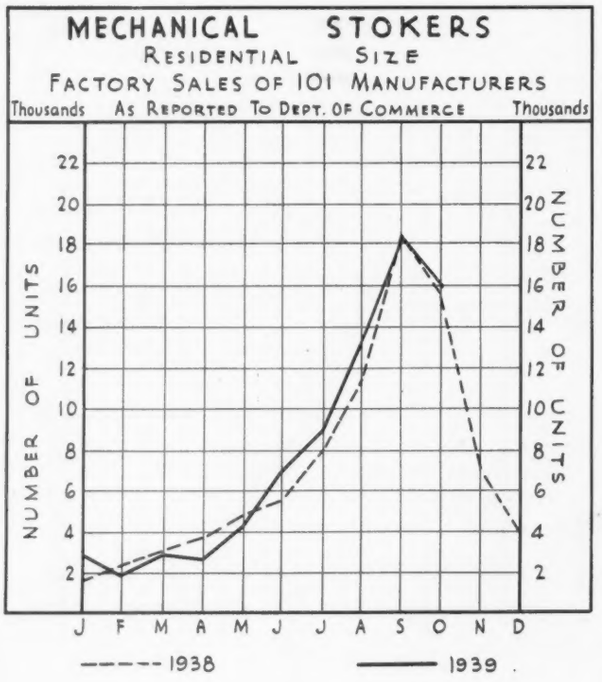
Current Business Trends

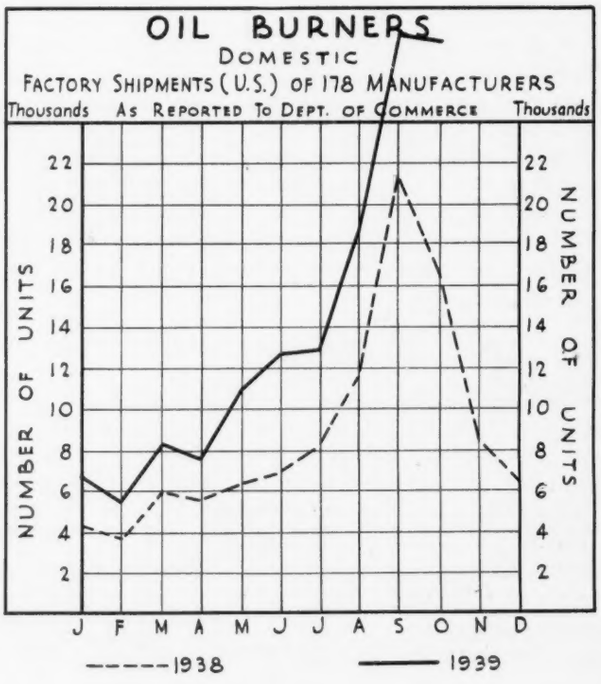
THE full story for 1939 sales of key products in this field, as based on Department of Commerce reports, cannot be told until March. It will be then, at the earliest, before the records of 276 manufacturers of winter air conditioning equipment and ventilating fans, 101 manufacturers of residential stokers and 178 manufacturers of domestic oil burners can be tabulated, assembled and totalled. It can now be seen, though, from the records of ten months portrayed in the charts below that 1939 was a good year in volume. It was considerably ahead of 1938 and, in some lines, compares favorably with some of the best years the industry has enjoyed.

The turn into 1940 comes on this increased level and will have improved prospects in many directions to support a continued large volume. F. W. Dodge anticipates an increase in residential building over a record total in 1939. The pronounced trend of recent years to warm air heating should mean that much of this increase will go to this industry.


WINTER AIR CONDITIONING
WARM AIR TYPE
ORDERS BOOKED BY 267 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
VALUE OF ORDERS - DOLLARS
VALUE OF ORDERS - DOLLARS
3300 3000 2700 2400 2100 1800 1500 1200 900 600 300
J F M A M J J A S O N D
----- Complete units, including furnace, blower, air cleaner, humidifier and controls.
—— Warm air furnaces, for sale separately.


FANS (VENTILATING AND CIRCULATING)
FOR SALE SEPARATELY
ORDERS BOOKED BY 267 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
VALUE OF ORDERS - DOLLARS
VALUE OF ORDERS - DOLLARS
1100 1000 900 800 700 600 500 400 300 200 100
J F M A M J J A S O N D

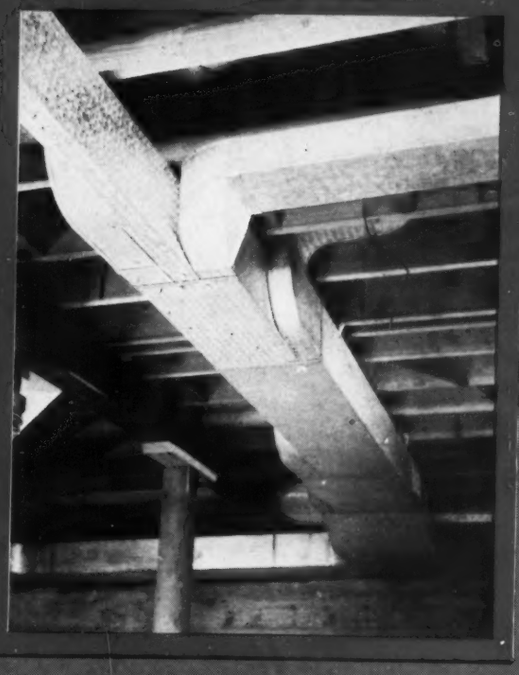

MECHANICAL STOKERS
RESIDENTIAL SIZE
FACTORY SALES OF 101 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
NUMBER OF UNITS
NUMBER OF UNITS
22 20 18 16 14 12 10 8 6 4 2
J F M A M J J A S O N D
----- 1938 —— 1939


OIL BURNERS
DOMESTIC
FACTORY SHIPMENTS (U.S.) OF 178 MANUFACTURERS
Thousands AS REPORTED TO DEPT. OF COMMERCE Thousands
NUMBER OF UNITS
NUMBER OF UNITS
22 20 18 16 14 12 10 8 6 4 2
J F M A M J J A S O N D
----- 1938 —— 1939

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

SECTION

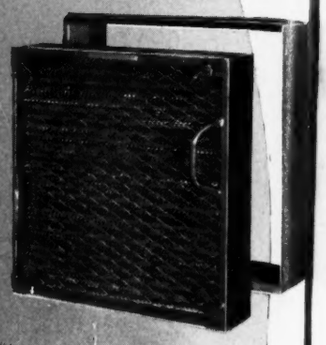


DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

AAF COMPLETE Air Cleaning SERVICE

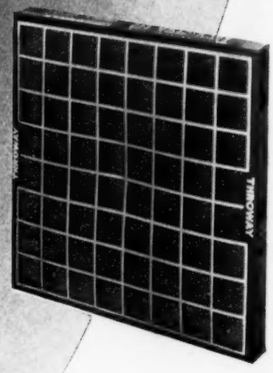
MW 4 FILTER

American unit filters—type MW—washable, viscous units are available in either 2" or 4" thicknesses. The 2" filter is for cleaning recirculated air in central systems, unit air conditioners, and domestic systems; the 4" type is for general ventilation and commercial air conditioning. Listed by Underwriters' Laboratory.



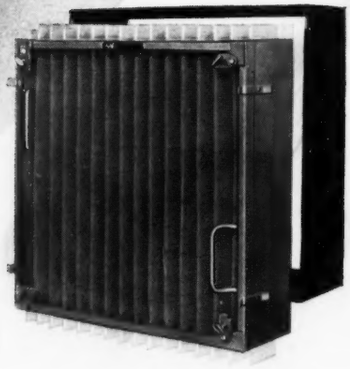
THROWAY

As the name implies, this filter is designed to be discarded after serving its maximum period of usefulness. Its cardboard container encloses filter pad of continuous strands of wire, coated with special fire-resisting adhesive. Particularly applicable to warm air heating and domestic air-conditioning systems.



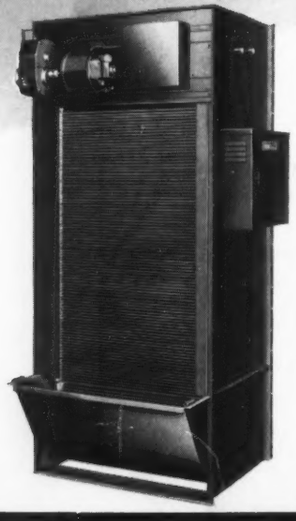
AIRMAT PL FILTER

The most practical and thoroughly satisfactory dry filter ever developed for ventilating and air-conditioning service. Tested and listed by the Underwriters' Laboratory. Uses patented air mat filtering medium, bonded fibre glass, or felt medium supplied in rolls for refills.



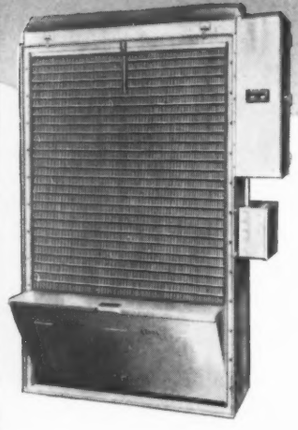
ELECTRO-MATIC

Combines advantages of electrical precipitation and automatic air filtration in single compact unit representing the most advanced and outstanding development in modern air cleaning service. Has established new standards of efficiency in dust removal over the complete range of dust particle sizes.



MULTI-PANEL

A fully automatic filter for either building or industrial ventilation and air-conditioning. Self-cleaning feature places operation on purely mechanical basis, eliminating need of attention and assuring satisfactory performance at all times. Available in any size or capacity.



Bulletins containing complete descriptions and engineering data on each of the above American Air Filters will be supplied without obligation upon request.

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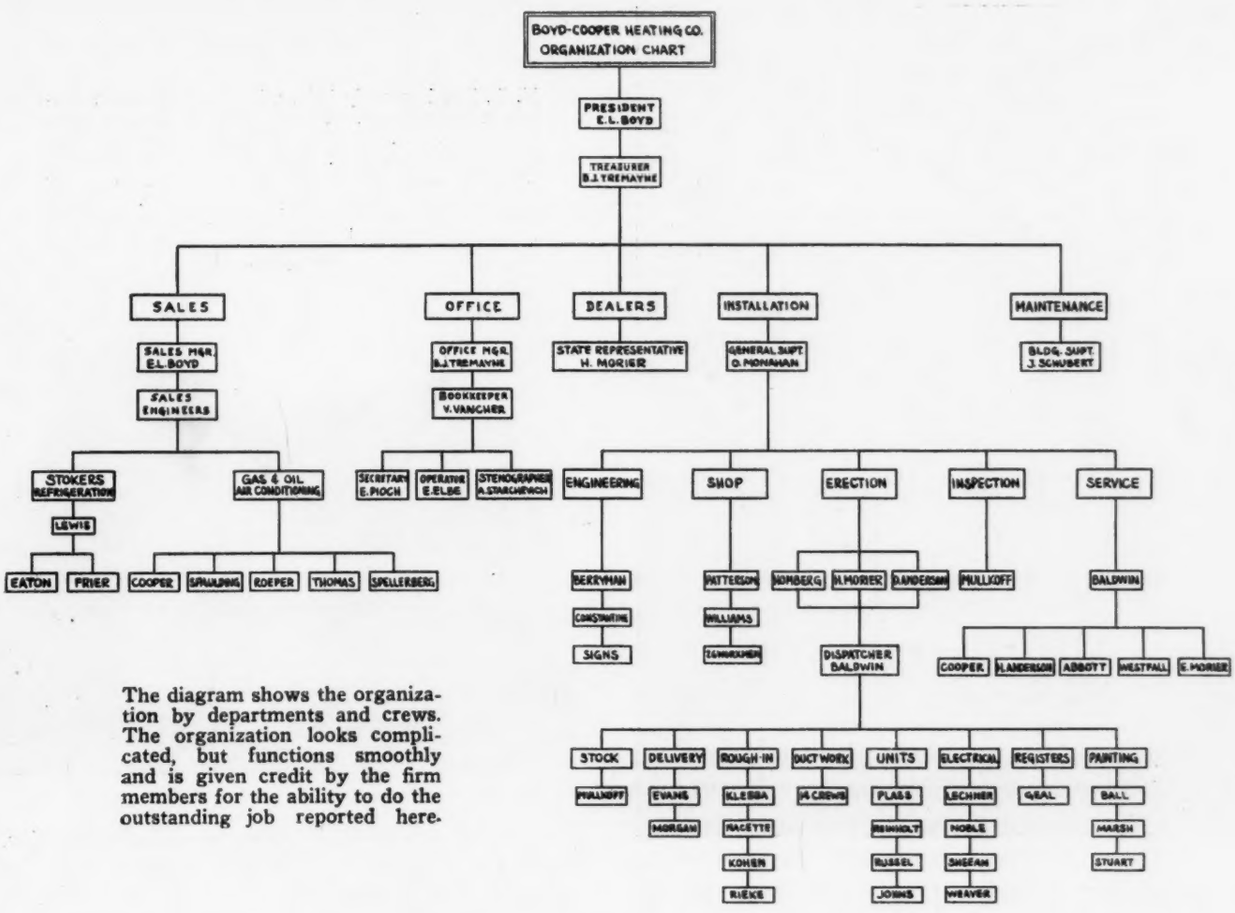
INCORPORATED
618 CENTRAL AVENUE LOUISVILLE, KY.

See the AAF Exhibit at the Cleveland A·S·H·V·E· Show *Booths 464-466*



The diagram shows the organization by departments and crews. The organization looks complicated, but functions smoothly and is given credit by the firm members for the ability to do the outstanding job reported here.

1,500 Winter Air Conditioning Systems in 1939

Boyd-Cooper, Detroit, undoubtedly is one of the country's largest winter air conditioning installers. The firm specializes in new house work, concentrates largely on gas and oil and has perfected an organization which permits—with profit—selling prices which are outstanding. What the firm sells, to whom and how they do it, constitutes this article.

PRACTICALLY without letup the city of Detroit and its suburbs have been building homes during the last six years. While there is no permit record to verify the statement, conservative estimates indicate that above 85 per cent of these newly built houses are heated with warm air. And, further, that above 85 per cent of all the warm air heating plants installed are winter air conditioning systems. Due to an advantageous gas rate, and to intensive promotion on oil, most of these winter air conditioning systems are automatically fired.

Because Detroit has been building new homes so consistently, while home building lagged elsewhere, wide attention has been attracted to the Detroit building program. For some reason, word has gotten around that winter air conditioning systems in Detroit have been and are pretty sketchy affairs.

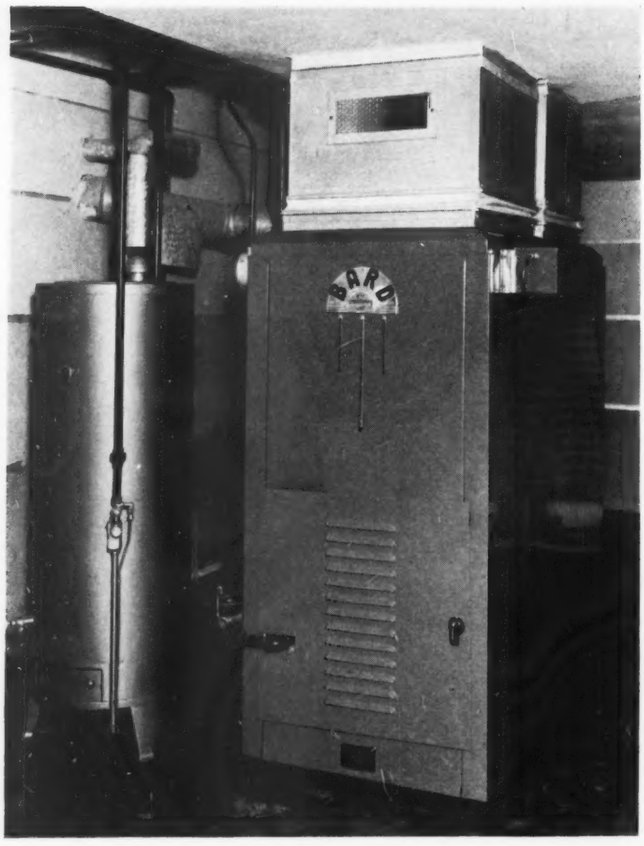
The truth or fallacy of this gossip will be left to readers of this article.

Numerous contractors bid and install these winter air conditioning systems. But in Detroit, when new house air conditioning is discussed, the firm of Boyd-Cooper is always mentioned in the first breath. The reason for this is not hard to find. Boyd-Cooper will install this year 1,500 winter air conditioning systems of which 90 per cent go into new houses and about 10 per cent go into old houses. How this large volume is handled by the firm and what the home owner gets for his money makes this story.

What the Owner Gets for "$335"

Of the two questions, perhaps what the owner gets for his money should come first. The impression seems to be that Detroit installations are "cheap" installations. If by "cheap" is meant that the owner gets trimmed, that is one thing, but if by "cheap" is meant that the heating system is substandard, that's something else.

The average selling price for Boyd-Cooper winter air conditioning installations in a five-room



E. L. Boyd recently built a home for himself. Below is the exterior. This is a typical Detroit small house and Mr. Boyd installed a typical "average $335" heating system. Left, is the unit. Below is the heat loss sheet figured the "short" way by Boyd-Cooper engineering department. These illustrations and those facing give a clear picture of what a Detroit home builder gets in heating for $335.

bungalow is $335.00. Judged by gossip, $335.00 sounds like a very low price. The only fair way to judge, however, is to find what the owner gets and in what kind of a house this average priced job is installed.

Boyd-Cooper sells the Bard gas-fired air conditioning unit. This is an AGA approved, Armco steel furnace, in a blue enamel square casing; the unit includes a 13-inch blower, 1/6-HP motor, filters, humidifier, complete controls (thermostat, fan switch, high limit switch)—all combined as a packaged unit. Accessories are all nationally advertised products—Clarage wheel, G-E motor, Minneapolis-Honeywell controls, Roberts-Gordon burner, Owens-Corning filters, etc. The input rating is 120,000 Btu per hour.

An "Average" Detroit House

The "average" new house in which this unit is installed is a five-room, one-story bungalow, partly insulated, with approximately 70,000 Btu per hour heat loss at the registers. Construction is brick veneer, or equal, the second floor space is not heated, but a blind stack is sometimes installed, fill insulation is in the ceiling, the ground plan is about 24 by 40 feet.

Boyd-Cooper standardizes, so far as possible, on the duct work. All ducts are rectangular, 8 inches deep. A Pittsburgh machine runs locks down the top and bottom of the sides; the bottom and top are edged for the Pittsburgh lock. Stack head dampers only are used—there are no quadrants or branch pipe dampers. This is done so that balancing is a matter of 20 minutes (by air volume) and not a full day's work. On the return side, joist spaces are panned and not lined. All branches are rectangular. Gauges of metal are strictly in accordance with the table of duct widths and gauges of the A.S.H. & V.E. Duct sections, both main and branches, are made in 4-foot lengths and are delivered to the job as completely assembled and identified sections ready for erection.

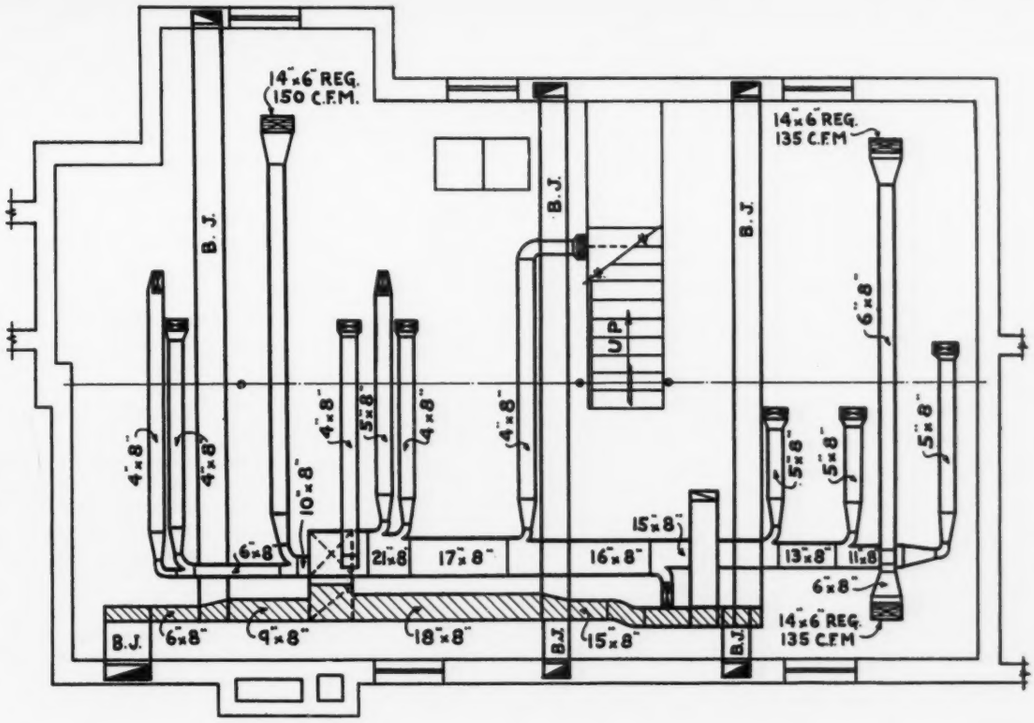
Registers, Returns, Air Distribution

In this "average" house stamped grilles are used. In kitchens and baths, where the walls are tiled, chrome plated faces are supplied. Both registers and grilles have valves and are installed in the prime coat only. Registers and returns are located

SIDE WALLS & CEIL. 4 ROCK WOOL

MR. BOYD 14567 PENROD

ROOM USE	LIV.	DIN.	KIT.	VEST.	BED°1	BED°2	BED°3	BATH	REC.	LAUND.			
LINEAL EXPOSURE	3 1/8	16/8	7/8	10/8	23/8	23/8	78/25	7/8	48/18	24/16			
ROOM DIMENSIONS	13.5/25	12/9	9/8	6/4	13/10	13/10	22/16	9/6.5	22/13	18/12			
WALL OUTSIDE GROSS	248	128	56	80	184	184	585	56	80	48			
GLASS	60	26	9	20	33	28	40	7	9	9			
WALL OUTSIDE NET	188	102	47	60	151	156	545	49	71	31			
WALL BASEMENT	"	"	"	"	"	"	"	"	325	162			
CEILING	176	108	"	24	117	117	352	"	"	"			
FLOOR	"	"	"	24	"	"	"	"	286	216			
INFILTRATION	1350	675	675	1440	1370	675	1350	540	675	1350			
EXPOSED DIRECTION													
HEAT LOSSES U 25° 80° 90°													
GLASS 1.13 90 102	5400	2340	810	1800	2970	2520	3600	715	810	810			
WALL 0. .08 6.4 7.2	1220		303	384	965	1000	3482	352	2780	1215			
WALL B. 54&99 13.5	312								438	2190			
CEILING .08 6.4	1724	690		154	750	750	2254						
FLOOR .066&34				204					4720	3560			
INFILTRATION.08 14.4 16.2	1370	1350	675	1440	1370	675	1350	540	675	1350			
H. LOSS B.T.U.	9114	4380	1788	3982	6055	4955	10686	1657	15365	9125			
EXPOSURE CORRECTION 10%	911	438	178	398	605	495	1068	165	1536	912			
TOTAL B.T.U. LOSS	10,025	4818	1966	4380	6760	5440	11,754	1822	16,901	10,037	=		
ACTUAL LENGTH												73,902 BTU	
ADD. FOR ELBOWS													
TOTAL EQUIV. LENGTH													
REG. TEMP. & C.F.M. FACT													
C.F.M. .015	150	72	30	66	101	83	175	27	254	150			
RD. PIPE & CORR. FACT												1108 CFM	
CORR. PIPE & RECT.													
STACK SIZE													



The basement piping plan (right) and the two floor plans (below) are from the E. L. Boyd house. Duct work is all rectangular; piping is sized to velocity in a house of this size; there is at least one supply (and two in the living room) and one return from each major room. This is a typical "$335" winter air conditioning installation.

BASEMENT

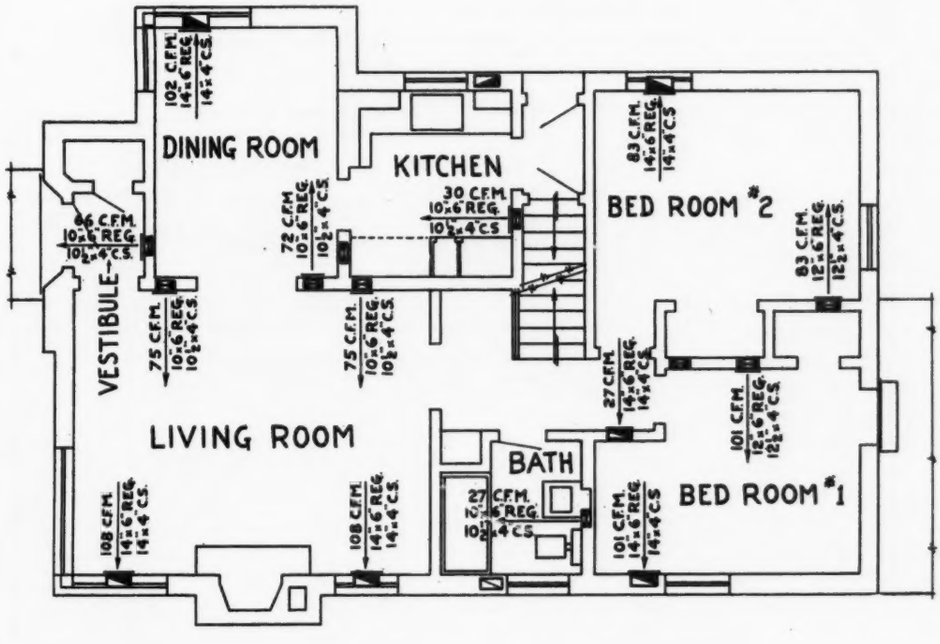
in the baseboard. In this "average" house, also, there will be two warm air registers in the living room with one return, one warm air register and no returns from bath and kitchen and one warm air register and one return in each of two bedrooms. The basement or the recreation room has one warm air supply, usually at the laundry tubs. Plenums are rectangular and are built straight up to the ceiling. Mains are tapped straight out of the plenum.

Boyd-Cooper will install one of these average $335.00 installations in a single house or a dozen houses, anywhere in the greater Detroit area.

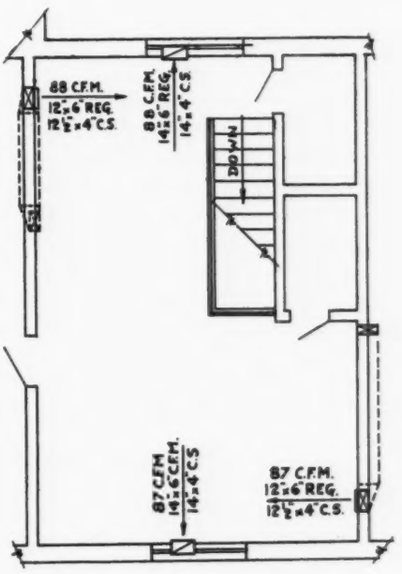
E. L. Boyd recently built a home for himself. In that house there is an "average" system except a large room is finished on the second floor. The plans of the house and photographs of the exterior and of the heating system are shown to illustrate just what an "average" installation looks like.

From the above description, it appears that the Detroit buyer of this "average" new house gets a substantial, well engineered, well installed winter air conditioning system. The question then is—how does Boyd-Cooper do it?

Reproduced with this article is a diagram of the Boyd-Cooper organization. It looks complicated and is complicated, but it is not inefficient; neither is it overstaffed for the volume of work handled. After several years of operations, each department functions smoothly and economically. Some of the



FIRST FLOOR PLAN



SECOND FLOOR PLAN

BOYD COOPER HEATING COMPANY
14471 Livernois Ave.,
Detroit, Mich.
"N. 2-8500

SALESMAN J. Roeper DATE 4/2/39
BUILDER Ray Dasher ADDRESS 15311 Wisconsin PHONE
OWNER Mr. & Mrs. A. Kiddle ADDRESS 15383 Manor PHONE
Size of building 25 x 40 Front exposure. N(X). E( ). S( ). W( ).
Outer wall construction Brick Veneer Roof construction Cedar Shingle
INSULATION: Side walls 3/4" Celotex Ceiling 4" Rockwool Storm windows No.
Storm Doors No. Weatherstripped Yes.
Misc. Information Size trunkline for future 2nd flr. rooms

HEATED BUILDING AREA
Ceil. Ht. Basement 7' 6" X ___ = 1000 square feet.
Ceil. Ht. 1st fl. 8' X ___ = 1000 " "
Ceil. Ht. 2nd fl. 8' X ___ = 500 " "
TOTAL 2500

DUCTS: Rectangular - ~~XXXXX~~
Make of grills B & C
Location grills Baseboard

COST SHEET

Unit price	200.00
Ducts 12 @ 11.00	132.00
Total	332.00
Sales Tax	9.96
Finance chge.	
Net price	341.96

LOCATIONS OF RECTANGULAR DUCT WORK.

ROOMS	WARM AIR	COLD AIR
Basement	1	-
Living rm.	2	1
Dining rm.	1	1
Kitchen	1	-
Bath	1	-
Bedroom	1	1
Bedroom	1	1
TOTALS	8	4

HEATING

HEATING SPECIFICATIONS FOR A BARD A.G.A. APPROVED GG-1 GAS FIRED WINTER AIR CONDITIONING SYSTEM AS INSTALLED BY THE BOYD-COOPER HEATING COMPANY.

1. *SCOPE OF WORK:*
The following specification covers the furnishing of all labor and material necessary for the installation of a complete gas fired winter air conditioning system.

2. *PLAN AND ENGINEERING:*
Provide two (2) blue print copies of air conditioning layout showing duct installation, unit placement and size of ducts, stacks, registers etc.

3. *UNIT:*
Install complete a BARD GG-1 gas fired winter air conditioning unit which has an input A.G.A. rating of 120,000 B.T.U's per hour and an output A.G.A. rating of 96,000 B.T.U's per hour. This BARD has a Clarage 18" diameter blower wheel and delivers 1200 C.F.M.. Unit is made of heavy gauge copper bearing steel with ½" hard asbestos block refractory lining and chrome-nickel steel flame baffle, flame does not contact metal. Unit is not subjected to extreme expansion and contraction stresses which cause noisy operation. The casing is attractive in design and is fabricated from furniture steel in a two toned baked enamel finish. This unit is equipped with complete Minneapolis-Honeywell controls, automatic float controlled humidifier, two 16 X 25 Owens-Illinois spun glass filters, General Electric 1/6 H.P. capacitor motor and the A.G.A. approved Roberts Gordon Gas Burner. Unit is very compact being only 28" wide by 49" long by 58" high.

4. *GENERAL:*
All material and workmanship to be first class in every respect and all labor shall be performed by mechanics, skilled in their trades, and properly supervised by competent Boyd-Cooper supervisors.

5. *SERVICE:*
Reasonably prompt service will be rendered for the installation, inspection, adjustment and repair of the complete system for a period of one year from date of installation.

6. *GUARANTEE:*
The Boyd-Cooper Heating Company guarantees that the system installed, when properly operated, shall warm all habitable rooms to 70 degrees at 10 degrees below zero if building is built according to plans and specifications as originally submitted to us. It is hereby understood that no guarantee applies until the installation has been paid for in full or as agreed.

Left, above—Salesman's Estimating Chart which he fills in when making an estimate and turns in with a signed order. The chart shows builder's and owner's name and address, size of building, insulation, construction, unit specified and the job price. Right, above—Heating specification. Five are given to the builder to submit to FHA. Specification covers unit description and guarantee. Below—To facilitate office work and maintain an accurate record, five copies are made of the Job Record. Blue copy is the invoice; white is office copy; pink is cost sheet for labor and material and final costing; yellow is pay voucher; orange is given the credit department.

◆

operations conducted under this plan of organization are unusual, as will be explained.

Salesmen's Territories and Income

To install this described "average" installation here is what takes place. First the sales force must sell the job. There are, usually, in the organization about six salesmen under the air conditioning sales manager. All Detroit is open to every salesman—there are no protected districts. However, builders are protected. To establish a protected builder the salesman must first contact the builder. After the first call that builder is the customer of one salesman so long as that salesman keeps contact regularly. There are about 1,600 builders listed on whom the salesmen call. Of the 1,600 builders, the Boyd-Cooper Corp. has about 350 for regular customers. Some build 5 houses a year—some build fifty houses, but so long as any salesman is calling on that builder no other salesman may call on him. Salesmen are paid a straight commission—no salary, no expenses, no drawing account. An active salesman will make about $4,000 a year. Out of this he must pay his expenses.

Proposals and Contracts

To sell a job the salesman must submit to the builder an Estimating Chart (illustrated) which shows the name of the builder, address, owner if any, location of the house, the general and special features of construction, location and number of warm air and return runs, the size and type of

OFFICE BOYD-COOPER HEATING CO. E-23760
14471 LIVERNOIS AVENUE
DETROIT, MICH.
UNIVERSITY 2-8500

NAME Ray Dasher ADDRESS 15311 Wisconsin
LOT NO. 134 HOUSE NO. 18650 ST. Strathmoor
BETWEEN Mr. & Mrs. A. Kiddle - Owner bet. 7 Mile & Margareta
15383 Manor
TAKEN BY J. Roeper ORDER NO. DATE 4/2/39

DESCRIPTION OF WORK AND MATERIAL

Install complete BARD gas fired air conditioner #GG-1 with controls
Install complete standard B & C rectangular duct work as per plans and specifications, using Auer forced air grilles - 12 openings.

	WA	CA
Basement	1	-
Living rm.	2	1
Dining rm.	1	1
Kitchen	1	-
Bath	1	-
Bedroom	1	1
Bedroom	1	1
	8	4

NET $341.96

TERMS: Net on completion.

CUSTOMER'S SIGNATURE

BARD #GG-1 UNIT SERIAL NUMBER X 178432

DATE 4/2/39 ORDER No. 23760 ROUND SQUARE X

MARK OPENINGS 4/4/39 DELIVERED

ROUGH IN 4/5/39 DELIVERED 4/5/39 PICK UP 4/5/39

REGISTERS ORDERED INSTALLED 5/25/39

TRUNK LINE ORDERED MEASURED 5/21/39 DELIVERED 5/23/39

ORDERED INSTALLED 5/21/39 INSTALLER White PICK UP 5/23/39

FURNACE ORDERED SET 5/20/39 INSTALLER Plass

BONNETS ORDERED MEASURED 5/21/39 ORDERED DELIVERED 5/23/39

BONNETS ORDERED SET 5/23/39 INSTALLER Klebba PICK UP 5/25/39

ELECTRICAL ORDERED WIRED 5/24/39 INSTALLER Lechner

HUMIDIFIER AND PAINTING ORDERED 6/3/39 INSTALLER Wall

UNIT START UP ORDERED 6/1/39 SERVICEMAN Westfall

FINAL CHECK UP 6/2/39 SERVICEMAN Monahan

OWNER A. Kiddle TELEPHONE Univ. 2-9715

BUILDER Ray Dasher TELEPHONE Ve. 6-0228

JOB ADDRESS 18650 Strathmoor Ave. LOT NO. 134

Above, left—Service card which is started upon receipt of order and maintained throughout the first year of warranty. A complete record of every call—when, by whom ordered, by whom done. The back of the card shows each call, by date. Above, right—The heating contract is written as a title retaining form. It is signed by both builder and owner, thus giving maximum protection. Below—The pay voucher is made in seven copies. The original goes to the supervisor of the district in which the job is located. One copy goes to each of the six crews (see text). If any change is ordered the change must be Ok'd before payment. Each price is checked against the master pay voucher to see that workmen do not change amount. Each crew voucher must be Ok'd by the supervisor to make sure work is properly performed before payment is made. Extras must be approved by supervisor and office.

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BOYD-COOPER HEATING COMPANY, Inc.
14471 Livernois Avenue
UNiversity 2-0500

Order Number 23760 Date 4/2/39

HEATING CONTRACT

FOR THE CONSIDERATION hereinafter provided, the undersigned Heating Contractor agrees to furnish to the Purchaser equipment, material and labor as specified below:—

Street 18650 Strathmoor Ave. City Detroit, Michigan

Builder Ray Dasher Address 15311 Wisconsin

Owner Mr. & Mrs. A. Kiddle Address 15383 Manor

ACCORDING TO THE FOLLOWING SPECIFICATIONS:

Install complete BARD gas fired air conditioner #GG-1 with controls..
Install complete standard B & C rectangular duct work as per plans and specifications, using Auer forced air grilles - 12 openings

	WA	CA		WA	CA
Basement	1	-	Bedroom	1	1
Living rm.	2	1	Bedroom	1/8	1/4
Dining rm.	1	1			
Kitchen	1	-			
Bath	1	-			

STIPULATION: It is understood that the owner or purchaser assumes responsibility for proper chimney draft. The owner further assumes all responsibility for any damage, pilferage or theft that may occur to the equipment and appurtenances after delivery to the building or job.

WORK TO BE DONE BY OTHER CONTRACTORS:
All necessary cutting and framing of ducts.
Electrical outlet and box for blower connection in heater room.
½" water tee connection, over unit, for humidifier.
Cutting or patching for any necessary work where duct work passes through.
Hot water coil connections if hot water coil is specified.

TITLE: It is further understood that the intention of the parties hereto is that said equipment and appurtenances shall remain personal property. And it is covenanted that the title of said equipment and appurtenances thereto shall remain in the heating contractors possession until the consideration hereinafter mentioned shall be fully paid. In the event of default on the part of the purchaser in the payment of part of the purchase price in accordance with this agreement, the heating contractor shall have full right, power and authority to enter upon said premises and remove the said equipment and appurtenances; and thereupon all payments which have been made by the purchaser, thereon, shall be forfeited to the heating contractor as compensation for the use of said equipment and appurtenances.

SERVICE: Reasonably prompt service will be rendered for the installation, inspection, adjustment and repair of the complete system for a period of one year from date of installation.

SALES PRICE: The net cost of the complete system covered in the above specifications will be $341.96 complete with tax, if taxable, subject to the following terms:

NET ON COMPLETION.

If terms of payment of this contract are not paid as agreed, an additional charge of two percent (2%) may be levied.

GUARANTEE: The heating contractor hereby guarantees that the system installed, when properly operated, shall warm the rooms connected to it with heat ducts, to 70 degrees at 10 degrees below zero weather, when building is built according to plans and specifications as originally submitted to us. It is hereby understood that no guarantee applies until the installation has been paid for in full or as agreed.

ACCEPTANCE: The purchaser has carefully read the foregoing proposition and agrees to the conditions as stated and furthermore agrees to accept same and make payment as specified. It is hereby understood that there are no agreements, verbal or otherwise, not mentioned in this contract.

WITNESS: J. Roeper (Sales Engineer) SIGNED Ray Dasher (L.S.)

ACCEPTED BY: E. L. Boyd (For the company) A. Kiddle (Owner) (L.S.)

DATED: April 2, 1939 ADDRESS: 15383 Manor Ave.,

Residence Phone Number Univ. 2-9715

Business Phone Number

unit and the sales price. At the same time the builder is given five copies of the Heating Specification for FHA, one copy for the builder, one copy for the owner. This specification describes the unit and the guarantee. If the proposal is accepted, the builder is given a Heating Contract which is a title retaining form (illustrated) and contains all pertinent information on the job. This is signed by both builder and owner.

After the contract is signed, the engineering department prepares the plan of the heating system. The plan for Mr. Boyd's house is typical and is shown. The engineers in the engineering department can layout about three plans a day per man. The average engineering cost per job, including heat loss, layout and making their own blueprint is about $2.50. Plans are drawn and submitted as complete double-line duct layouts, with ducts sized to velocity on small houses and to resistance in larger houses. The heat loss sheet shown is also prepared by the engineering department.

PAY VOUCHER

BOYD-COOPER HEATING CO.
14471 Livernois Avenue
Detroit, Michigan

Order No. 23760

Name Ray Dasher Address 15311 Wisconsin

Lot No. 134 House No. 18650 Address Strathmoor

Between 7 Mile and Margarete

Taken by J. Roeper Date 4/2/39 19

Description of Work and Materials

Install BARD #GG-1 gas unit.
Install standard B & C rect. duct work - Auer grilles - 12 openings

	WA	CA
Basement	1	-
Living rm.	2	1
Dining rm.	1	1
Kitchen	1	-
Bath	1	-
Bedroom	1	1
Bedroom	1/8	1/4

Labor allowed on:
SIGN
Oil Rough in
Thermo Rough in
Rough in
Unit
Basement duct 1
Basement duct 2
Registers
Electrical
Clean-up
TOTAL

Labor Approved by

Payment Authorized by

Workman
Amount
Date

Voucher must be turned in to Supervisor to receive pay.

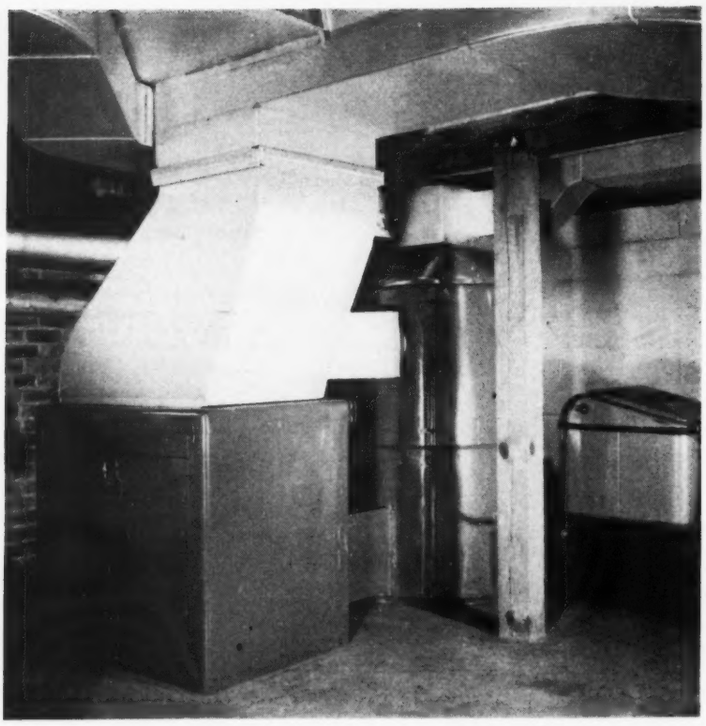
Supervisor—Key to Installation

One important organization unit is the supervisor. Each supervisor is an engineer; there are five supervisors and each is in charge of a specified section of the Detroit area. One supervisor works with old houses only. The supervisor is in charge of engineering and installation of all jobs in his district. When a job is secured he visits the house and marks the openings for the carpenters. He takes the engineering department plan and heat loss to the job and checks to see that the house is constructed as called for and that the heating system designed will go in as planned. He must approve all installation crew work to see that each operation is installed as specified; he must approve all extras, and check the installation after completion. The supervisor also prepares the shop layout from which the duct system is fabricated. He is paid a salary.

Six Crews Install Each Job

The actual installation of a job is unusual. On the average job as described six crews have a part of the work. The first crew (usually three men) do

(*Continued on page* 175)



Typical Peterson winter air conditioning system "costed" by Price per Opening.—Photos by the Author.

Price per Opening Is A Sound Pricing Method

By J. E. Peterson
Hinsdale, Ill.

LATE in 1933 I became concerned over the extraordinary amount of time required to estimate the cost of duct work for winter air conditioning systems. Hours were spent calculating heat losses, duct sizes—all of which seemed necessary, but more hours were required to estimate the pounds of galvanized iron, weight of fittings and the amount of labor necessary to fabricate this duct work in the shop and erect the duct work in the field.

All this had to be done for each job before a reasonably safe quotation could be submitted.

Like most other contractors, I did not mind so much this expenditure of time on those jobs which resulted in sales—but the hours spent on quotations which finally did not materialize as jobs was just so much wasted effort.

Pounds of G. I. Takes Too Much Time

To figure duct work by the pound requires a reasonably accurate layout as we must know duct sizes and lengths. Also, any given duct system, painstakingly figured in proposal, may be subject to later changes when actual installation is made.

By consulting my records and talking with other contractors it became apparent that prices I was quoting and others were quoting varied considerably in 1933 and 1934. The variation in my prices, and in the prices of others, based on poundage, was just as wide as are the present prices on a per opening basis. These differences, I am sure, were due to differences in quantities estimated and to the tendency to establish prices on hearsay rather than on cost accounting.

Selling prices in many branches of the construction industry are estimated from volume, quantity, labor, or any other unit which experience indicates has a reasonably fixed relationship to the component parts. Ductwork by the pound properly assumes this relationship between the pounds of galvanized steel a sheet metal worker may fabricate and erect in a unit of time. It is as accurate as the accounting system on which it is based. I was not concerned about the accuracy of the poundage method but it did seem reasonable that some additional fixed relationship existed in our estimating structure—perhaps the poundage per opening—which would eliminate the necessity for hours of calculation.

Is There No Better Method?

The logical solution to this problem seemed to be—consult cost and material records and apply a little original thinking. It very quickly became apparent that the problem was not going to get easier; rather, it was going to become more acute. Requests for quotations on winter air conditioning

Table II (Fig. 2)

Basement

Item	Sizes			
Branch Elbows	10x3½ to 10x4	12x3½ to 12x4	12x3½ to 12x5	14x3½ to 14x6
Duct Elbows	4x10 to 4x8	4x12 to 4x8	5x12 to 5x8	6x8
Transitions	10x3½ to 4x8	12x3½ to 4x8	12x3½ to 5x8	14x3½ to 6x8
Elbows	4x8	4x8	5x8	6x14 to 6x8

systems were increasing in 1934. Everyone wanted rectangular duct work. Sales were increasing and standards were getting higher and higher. Installation problems multiplied along with costs and like other contractors, we were laying complete duct systems out on the shop floor in our effort to keep cost and labor of fittings at a minimum.

Step 1—Duct Standardization

The first progress toward a solution came when we decided to standardize our duct work. The fabrication and erection of trunk lines was then and is now a simple proposition of straight lengths with a few elbows and angles. But the branches were the headache. Our plans showed that the average branch had at least four and sometimes more small fittings. The shop time required to fabricate the eighty small fittings required for an average job ran costs out of sight.

Further study of typical plans showed that room sizes were fairly consistent and quickly fell within certain branch size brackets. A consistent requirement of 70 to 200 cfm was indicated from our plans so it seemed logical that we could standardize on three branch sizes. Rooms requiring less than 70 cfm could be handled by dampering; rooms requiring more than 200 cfm would have two or more registers. So we prepared a schedule for three sizes.

Sizes Established as Standard

The sizes we selected have a reasonable consistency in frictional resistance, for the branches, stacks, registers, but we felt that conforming to customary studding space construction, sheet sizes and a minimum number of fittings, was more important than resistance.

The schedule we worked out follows:

Branch Fitting Size Schedule

C. F. M.	Basement Branch	Stack	Register
0- 70	4x8	10x3½	10x6
70-110	4x8	12x3½	12x6
110-160	5x8	12x3½	12x6
160-200	6x8	14x3½	14x6

The mere listing of these sizes indicated standardization was desirable. While these sizes are common now, in 1933 and 1934 wide variations were common to heating layouts. Every departure from standard sizes of stacks, registers; every different depth of duct; every change in dimensions, meant additional fittings. And every fitting which could not be made from a familiar pattern, or required a special pattern, meant rapidly increasing shop costs.

Some additional study of our sizes and types of pipe lengths and fittings used in the basement showed even more striking need for reducing the number and the sizes of these sections. Table 1 shows sizes we now use for roughing in and Table 2 shows items used in basement work. By reducing the number and sizes of items we then used to these few sizes we found that a complete duct system from register to the main could be taken off our revised tables knowing that few "specials" would be needed and that everything was stock or readily fabricated.

Table I (Fig. 1)

First and Second Floor

Item	Sizes		
Tops	10x3½	12x3½	14x3½
Stack Elbows	10x3½	12x3½	14x3½

Jobs Average 60 Pounds per Opening

Having thus considerably simplified the number of fittings used and thereby reduced shop labor, field labor and engineering time, the next step was to determine how best this information could be used to set up some quick estimating method.

In my quest for a rapid method to estimate prices of ductwork, I began to tabulate the quantities of sheets each job required and made the interesting

High plenums with straight takeoffs, are a standardized feature of the author's methods.

Table III

Item	Total—in Dollars	Cents Per Pound (900 lb.)*	Average Cost Per Opening (16)**
Galvanized Steel	40.00	.044	2.50
Labor (1)	125.00	.139	7.81
Registers	37.00	.041	2.31
Miscellaneous (2)	8.00	.008	.50
Totals	210.00	.232	13.12

(1) Labor to erect equipment not included.
(2) Dampers, etc.
*900 pounds is average material requirement for a job.
**16 openings in an average job of ours.

Table IV

TABLE OF POUNDAGE
(New Construction)

Job Number	No. Openings	Total Pounds Used	Pounds Per Opening
1.	32	1800	56
2.	19	1120	60
3.	14	854	61
4.	30	1602	54
5.	16	900	56
6.	16	1010	63
		Average	58

discovery, as each job was completed and analyzed, that the sheets invariably totaled approximately 60 pounds per opening.

The relationship of the items entering into the ductwork costs of an average winter air conditioning system are revealed in the typical analysis in Table III.

Labor and Quantity the Variables

It became obvious that the variable factors entering into our estimating were sheet quantity and labor. Even if poundage was calculated and costs estimated by the pound, so that we had only one variable in the structure, labor still had to be established from past experience. It seemed just as logical to estimate the average pounds per opening as to estimate the average labor cost per pound.

Study of the figures cited reveals that assuming a certain poundage per opening is the only difference between the two methods of estimating. The amount, approximately 60 pounds per opening, has sometimes been cited as a reason to belittle the opening method. However, this amount is our own poundage and is not fixed and can be varied to suit the peculiarities of any contractor's particular method of installation. Each item may be varied, and should be, in accordance with each contractor's installation practices. The items cannot be established by hearsay, but should be based upon averages of costs of actual installations. In other words, the price per opening does not eliminate individual job accounting.

Long Runs-Short Runs Compensate

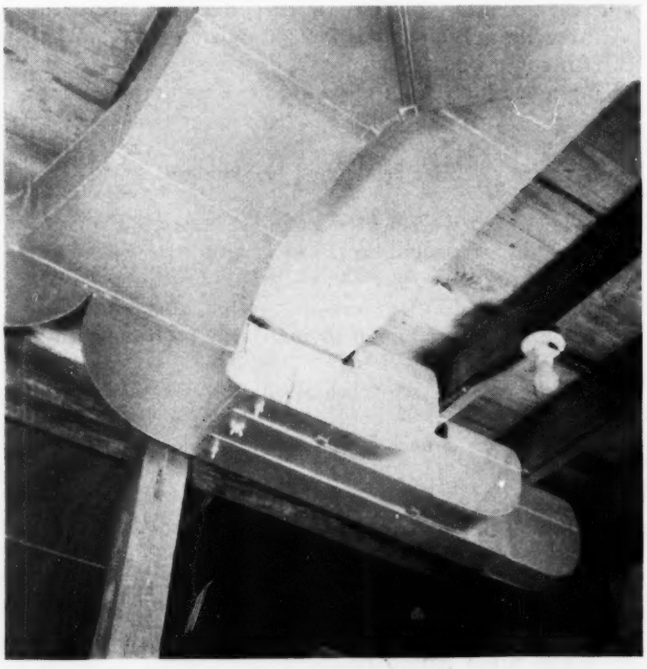
Also, there's an ace in the hole. As poundage per opening decreases, labor tends to increase in a greater proportion than the poundage decrease. This is because short runs, as a job of low poundage would be, have excessive fittings—and require working at close quarters. I have found this relationship to exist but cannot substantiate it by records except for about two cases. Knowing the mechanical difficulties, I have avoided the installation of square ductwork when the furnace is in a center or gravity position. I would rather move the furnace or run small round pipes.

P/O Foundation

From this analysis, and supported by subsequent installation costs, I developed the following structure as my basis to estimate the ductwork for winter air conditioning system:

Galvanized Steel 60 lbs. @ .06 (1)	$ 3.60
Register	2.35
Labor	8.00
Total	13.95
Gross Profit	6.05
Selling Price Per Opening	20.00

(1) Price includes unaccountable steel such as keeper, cleats, etc.



The expanding branch takeoff shown is another standardized section which eliminates an intricate fitting.

I did not publicize this method of estimating because it represented my experience for one year's period. However, I confided the information to a fellow contractor in a near-by community and we agreed to try the system and see how we came out.

(*Continued on page* 174)

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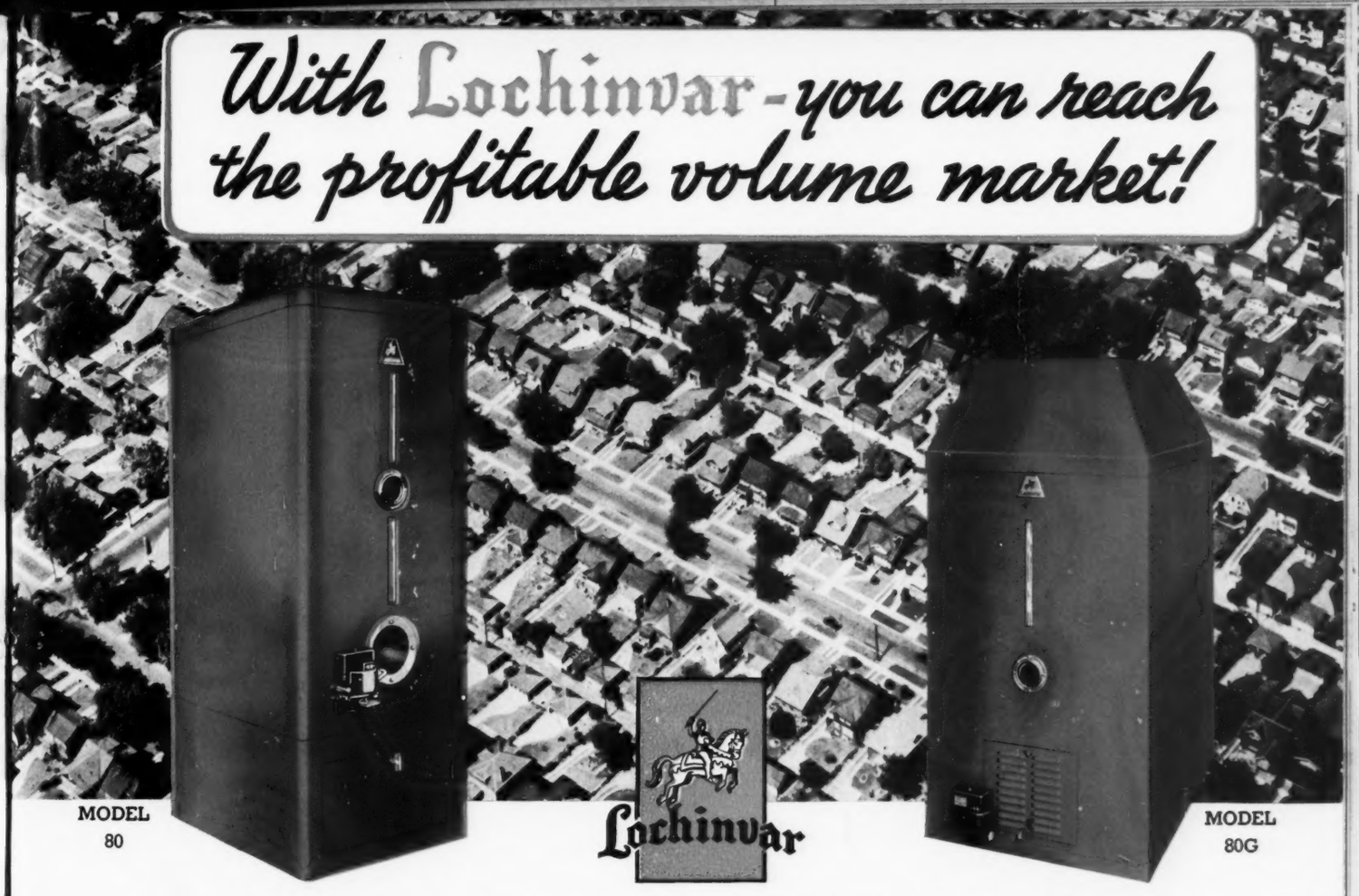

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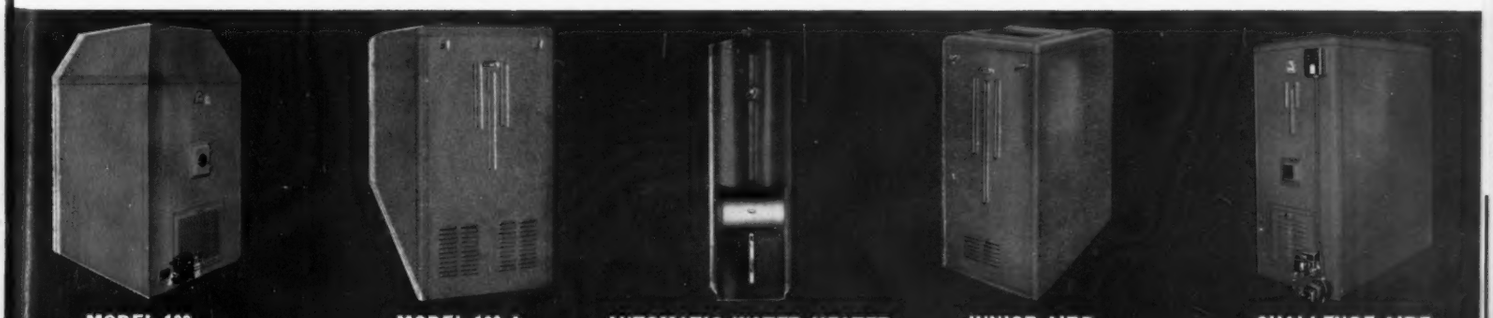

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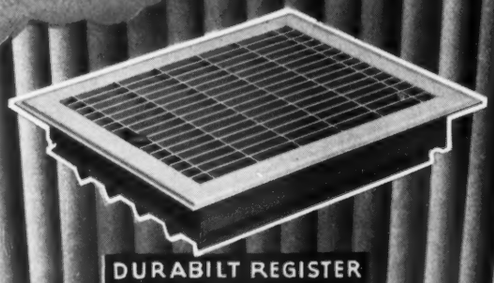

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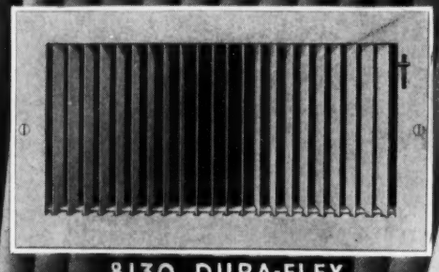

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Velocity Method For Sizing Ducts

In the March, 1939 issue, the author discussed the practical advantages of sizing ducts by the velocity method and presented two tables for pipes 8 and 10 inches deep. Considerable comment was submitted, together with requests for additional Tables. These requested Tables, Mr. Wagstaff has worked out and submits here, together with a typical job application.

By Alfred R. Wagstaff
Engineer, Sioux City Fdy. and Boiler Co., Sioux City, Iowa

THE forced air heating contractor does not have much time to spend in making duct calculations and therefore usually welcomes a chance to save time and assure accuracy by the use of simple methods and tables. This has been shown by the requests for the rest of the duct capacity tables after two were published in the March, 1939, issue of American Artisan.

Herewith is a continuation of the tables taking up the other most used sizes of ducts in heating and ventilating work.

A Typical Use of the Tables

To illustrate the ease and simplicity of using the accompanying tables an example is given. First, make a layout of the job in order to get the actual distances between bonnet and register and the temperature drop and to know just how the job is going to be installed.

Second, make a schedule of the cfm demand of all the branches and trunk lines, starting with the farthest branch from the furnace and ending up at the furnace, adding each branch to the trunk as you work back and as shown in the schedule at the bottom of this page.

Most contractors have some particular duct velocity which they favor and use in their forced air work. In this example 600 FPM will be used.

After deciding on the velocity to be used, the depth of the ducts and branches will have to be decided on, in this instance the 9-inch depth will be used. The schedule thus far has only the branch and trunk CFM's noted. To complete the schedule, start with branch 1 and look down the column headed "600" on the 9-inch chart (left hand section). Branch No. 1 requires 132 cfm and the closest we find to that number is 138. Glancing to the left the width is found to be 4 inches so 9 × 4-inch is jotted down in the column "Branch Size, Inches." Continue this procedure for all the branches. The trunk is sized in the same manner. But to find trunk capacities we must add together the cfm's of branches which join to make up each trunk section. Thus our first trunk carries the air volume of branch 1 (132 cfm) plus air volume of branch 2 (148 cfm) equals 280 cfm. The first total of the branches is 280 cfm while 283 cfm appears in the "600" column for a width of 9 × 8 inches. When the bottom of the schedule is reached the ducts are all sized and the method only takes a few minutes.

Some contractors do not run their branches at the same velocity as the main trunk line, using a lower velocity in the trunks. If, for instance, 400 FPM is used in branches, the branch sizes are found in the column "400," as No. 1 is 9 × 6 inches, No. 2 is 9 × 6½ inches, No. 6 is 9 × 5½ inches. These last two are found by allocation.

After the publication of the previous tables in the March issue, the question was raised as to how the capacities of the ducts was computed. The

Branch Room	CFM, Each Branch	Branch, Size Inches	Total Air for Trunk, CFM	Trunk Size, Inches
1—Bed Room	132	9 x 4	...	....
2—½ Living Room & Vestibule	148	9 x 4½	280	9 x 8
3—Dining Room	132	9 x 4	412	9 x 12
4—½ Living Room & Vestibule	148	9 x 4½	560	9 x 16
5—Kitchen	118	9 x 3½	678	9 x 20
6—Bed Room	124	9 x 4	802	9 x 24
7—Bath	58	9 x 3	860	9 x 25½
8—Bed Room	108	9 x 3½	968	9 x 29

carrying capacities of ducts are computed on round pipe sizes because of the friction involved, and the accompanying tables carry the diameter and area of round pipe in Columns 2 and 3. As an example, an 8 inch by 22 inch duct and an 11 inch by 16 inch duct both have the same area of 176 square inches, but the 8 by 22-inch duct has a perimeter of 60 inches and the equal friction of a 14.2 inch diameter round pipe with an area of 158.4 square inches while the 11 by 16-inch duct has a perimeter of 54 inches and the equal friction of a 14.5-inch diameter round pipe with an area of 165.1 square inch. The greater surface in the 8 by 22-inch duct causes more friction, retarding the free flow of air.

The accompanying charts are a combination of the following formulae:

$$d = 1.265 \sqrt[5]{\frac{(a\ b)^3}{(a+b)}} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where d = diameter of round pipe
a and b = sides of rectangular duct

$$A = .7854 \times D^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where A = area of round pipe
D = diameter of round pipe

$$CFM = \frac{\text{Area} \times \text{FPM}}{144} \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where CFM = Cubic Feet per minute
FPM = Feet per minute

To illustrate the use of the above formulae: Using the 8 by 22 inch duct and substituting in formula (1)

$$d = 1.265 \sqrt[5]{181726} = 1.265 \times 11.27 = 14.2 \text{ inches.}$$

and substituting in formula (2):

$$A = .7854 \times (14.2)^2 = .7854 \times 201.64 =$$

$$158.368 = 158.4 \text{ sq. in.}$$

For those interested in the factor of $\frac{\text{FPM}}{144}$ for the various velocities, the following table has been worked out:

FPM	Factor	FPM	Factor
200	1.389	650	4.514
250	1.7363	700	4.861
300	2.0833	750	5.2084
350	2.432	800	5.556
400	2.778	850	5.903
450	3.125	900	6.250
500	3.4723	950	6.597
550	3.820	1000	6.945
600	4.167	1500	10.4167

CFM = Area × Factor

Tables of capacities of rectangular ducts and round pipes of equal friction follow.

CARRYING CAPACITIES OF RECTANGULAR DUCTS AND ROUND PIPES OF EQUAL FRICTION — DEPTH 9 IN.

WIDTH	FREE AREA	ROUND PIPE DIA.	VELOCITY - FEET PER MINUTE								
			300	350	400	500	600	700	800	900	1000
INCHES			CUBIC FEET PER MINUTE								
2½	19.6	5.0	40	48	54	68	82	95	109	123	136
3	23.8	5.5	50	58	66	83	99	116	132	149	165
3½	28.3	6.0	59	69	79	98	118	138	157	177	197
4	33.2	6.5	69	81	92	115	138	161	184	208	230
4½	37.4	6.9	78	91	104	130	156	182	208	234	259
5	41.9	7.3	87	102	116	145	175	204	233	262	291
6	50.3	8.0	105	122	140	175	210	245	279	314	349
7	59.4	8.7	124	144	165	206	248	289	330	371	413
8	67.9	9.3	141	165	189	236	283	330	377	424	472
9	77.0	9.9	160	187	214	267	321	374	428	482	535
10	84.9	10.4	177	206	236	295	354	413	472	531	590
11	93.3	10.9	194	227	259	324	389	454	518	583	648
12	102.1	11.4	213	248	284	354	425	496	567	638	709
13	109.4	11.8	228	266	304	380	456	532	608	684	760
14	118.8	12.3	247	289	330	412	495	577	660	743	825
15	126.7	12.7	264	308	352	440	528	616	704	792	880
16	134.8	13.1	281	323	374	468	562	655	749	843	936
17	143.1	13.5	298	348	398	497	596	696	795	894	994
18	149.6	13.8	312	364	416	519	623	727	831	935	1039
19	158.4	14.2	330	385	440	550	660	770	880	990	1100
20	165.1	14.5	344	401	459	573	688	803	917	1032	1147
21	174.4	14.9	363	424	484	606	727	848	969	1090	1211
22	181.5	15.2	378	441	504	630	756	882	1008	1134	1261
23	188.7	15.5	393	459	524	655	786	917	1048	1179	1311
24	196.1	15.8	409	477	545	681	817	953	1090	1226	1362
25	203.6	16.1	424	495	566	707	848	990	1131	1273	1414
26	211.2	16.4	440	513	587	733	880	1027	1173	1320	1467
27	219.0	16.7	456	532	608	760	913	1064	1217	1369	1521
28	227.0	17.0	473	552	631	788	946	1103	1261	1419	1577
29	232.4	17.2	484	565	646	807	968	1130	1291	1453	1614
30	240.5	17.5	501	584	668	835	1002	1169	1336	1503	1670
31	246.1	17.7	513	598	684	854	1025	1196	1367	1538	1709
32	254.6	18.0	530	618	707	884	1061	1237	1414	1591	1768
33	260.2	18.2	542	632	723	903	1084	1265	1446	1626	1807
34	268.8	18.5	560	653	747	933	1120	1307	1493	1680	1867
35	274.6	18.7	572	667	763	953	1144	1335	1526	1716	1907
36	283.5	19.0	591	689	788	984	1181	1378	1575	1772	1969
37	289.5	19.2	603	703	804	1005	1206	1407	1608	1809	2010
38	295.6	19.4	616	718	821	1026	1232	1437	1642	1848	2053
39	301.7	19.6	629	733	838	1048	1257	1467	1676	1886	2096
40	307.9	19.8	641	748	855	1069	1283	1497	1711	1924	2138
41	314.2	20.0	655	764	873	1091	1309	1527	1746	1964	2182
42	323.7	20.3	674	787	899	1124	1349	1574	1798	2023	2248
43	330.1	20.5	688	802	917	1146	1376	1605	1834	2063	2293
44	336.5	20.7	701	818	935	1168	1402	1636	1870	2103	2337
45	343.1	20.9	715	834	953	1191	1430	1668	1906	2144	2383
46	349.7	21.1	729	850	971	1214	1457	1700	1943	2186	2429
47	356.3	21.3	742	866	990	1237	1485	1732	1980	2227	2475
48	363.1	21.5	756	882	1009	1261	1513	1765	2017	2269	2522
49	369.8	21.7	770	899	1027	1284	1541	1798	2055	2311	2568
50	376.7	21.9	785	915	1046	1308	1570	1831	2093	2354	2616
51	380.1	22.0	792	924	1056	1320	1584	1848	2112	2376	2640
52	387.1	22.2	806	941	1075	1344	1613	1882	2151	2419	2688
53	394.1	22.4	821	958	1095	1368	1642	1916	2190	2463	2737
54	401.2	22.6	836	975	1115	1393	1671	1950	2229	2508	2786
55	404.7	22.7	843	983	1124	1405	1686	1967	2249	2529	2811

CARRYING CAPACITIES OF RECTANGULAR DUCTS AND ROUND PIPES OF EQUAL FRICTION

DEPTH 7 IN.

WIDTH	FREE AREA	ROUND PIPE DIA.	VELOCITY - FEET PER MINUTE								
			300	350	400	500	600	700	800	900	1000
INCHES			CUBIC FEET PER MINUTE								
2½	15.9	4.5	33	39	44	55	66	77	88	99	110
3	18.1	4.8	38	44	50	63	75	87	101	113	126
3½	22.9	5.4	48	56	64	80	95	111	127	143	159
4	26.4	5.8	55	64	73	92	110	128	147	165	183
4½	29.2	6.1	61	71	81	101	122	142	162	183	203
5	33.2	6.5	69	81	92	115	138	161	184	208	230
6	38.5	7.0	80	94	107	134	160	187	214	241	267
7	46.6	7.7	97	113	129	162	194	227	259	291	324
8	52.8	8.2	110	128	147	183	220	257	293	330	367
9	59.4	8.7	124	144	165	206	248	289	330	371	413
10	66.5	9.2	139	162	185	231	277	323	369	416	462
11	72.4	9.6	151	176	201	251	302	352	402	453	503
12	78.5	10.0	164	191	218	273	327	382	436	491	545
13	84.9	10.4	177	206	236	295	354	413	472	531	590
14	91.6	10.8	191	223	254	318	382	445	509	573	636
15	96.8	11.1	202	235	269	336	403	471	538	605	672
16	102.1	11.4	213	248	284	354	425	496	567	638	709
17	109.4	11.8	228	266	304	380	456	532	608	684	760
18	115.0	12.1	240	279	319	399	479	559	639	719	799
19	120.8	12.4	252	294	336	419	503	587	671	755	839
20	126.7	12.7	264	308	352	440	528	616	704	792	880
21	130.7	12.9	272	318	363	454	545	635	726	817	908
22	136.8	13.2	285	332	380	475	570	665	760	855	950
23	143.1	13.5	298	348	398	497	596	696	795	894	994
24	149.6	13.8	312	364	416	519	623	727	831	935	1039
25	153.9	14.0	321	374	428	534	641	748	855	962	1069
26	160.6	14.3	335	390	446	558	669	781	892	1004	1115
27	165.1	14.5	344	401	459	573	688	803	917	1032	1147
28	172.0	14.8	358	418	478	597	717	836	956	1075	1195
29	176.7	15.0	368	429	491	614	736	859	982	1104	1227
30	181.5	15.2	378	441	504	630	756	882	1008	1134	1261
31	186.3	15.4	388	453	518	647	776	906	1035	1164	1294
32	191.1	15.6	398	464	531	663	796	929	1062	1194	1327
33	196.1	15.8	409	477	545	681	817	953	1090	1226	1362
34	203.6	16.1	424	495	566	707	848	990	1131	1273	1414
35	206.1	16.2	429	501	573	716	859	1002	1145	1288	1431
36	211.2	16.4	440	513	587	733	880	1027	1173	1320	1467
37	216.4	16.6	451	526	601	751	902	1052	1202	1353	1503
38	221.7	16.8	462	539	616	770	924	1078	1232	1386	1540
39	227.0	17.0	473	552	631	788	946	1103	1261	1419	1577
40	232.4	17.2	484	565	646	807	968	1130	1291	1453	1614
41	237.8	17.4	495	578	661	826	991	1156	1321	1486	1652
42	243.3	17.6	507	591	676	845	1014	1183	1352	1521	1690
43	248.8	17.8	518	605	691	864	1037	1209	1382	1555	1728
44	254.5	18.0	530	618	707	884	1061	1237	1414	1591	1768
45	260.2	18.2	542	632	723	903	1084	1265	1446	1626	1807
46	265.9	18.4	554	646	739	923	1108	1293	1477	1662	1847
47	271.7	18.6	566	660	755	943	1132	1321	1510	1698	1887

CARRYING CAPACITIES OF RECTANGULAR DUCTS AND ROUND PIPES OF EQUAL FRICTION

DEPTH 14 IN.

WIDTH	FREE AREA	ROUND PIPE DIA.	VELOCITY - FEET PER MINUTE								
			300	350	400	500	600	700	800	900	1000
INCHES			CUBIC FEET PER MINUTE								
2½	29.2	6.1	61	71	81	101	122	142	162	183	203
3	35.3	6.7	74	86	98	123	147	172	196	221	244
3½	43.0	7.4	90	104	119	149	179	209	239	269	299
4	49.0	7.9	102	119	136	170	204	238	272	306	340
4½	56.7	8.5	118	138	158	197	236	276	315	354	394
5	62.2	8.9	130	151	173	216	259	302	346	389	432
6	77.0	9.9	160	187	214	267	321	374	428	482	535
7	91.6	10.8	191	223	254	318	382	445	509	573	636
8	103.9	11.5	216	252	289	361	433	505	577	649	722
9	118.8	12.3	247	289	330	412	495	577	660	743	825
10	130.7	12.9	272	318	363	454	545	635	726	817	908
11	145.3	13.6	303	353	404	504	605	706	807	908	1009
12	160.6	14.3	335	390	446	558	669	781	892	1004	1115
13	174.4	14.9	363	424	484	606	727	848	969	1090	1211
14	186.3	15.4	388	453	518	647	776	906	1035	1164	1294
15	201.1	16.0	419	489	559	698	838	978	1117	1257	1397
16	213.8	16.5	445	520	594	742	891	1039	1188	1336	1485
17	227.0	17.0	473	552	631	788	946	1103	1261	1419	1577
18	237.8	17.4	495	578	661	826	991	1156	1321	1486	1652
19	251.6	17.9	524	611	699	874	1048	1223	1398	1573	1747
20	265.9	18.4	554	646	739	923	1108	1293	1477	1662	1847
21	277.6	18.8	578	675	771	964	1157	1349	1542	1735	1928
22	289.5	19.2	603	703	804	1005	1206	1407	1608	1809	2010
23	301.7	19.6	629	733	838	1048	1257	1467	1676	1886	2095
24	314.2	20.0	655	764	873	1091	1309	1527	1746	1964	2182
25	326.9	20.4	681	794	908	1135	1362	1589	1816	2043	2270
26	339.8	20.8	707	826	944	1180	1416	1652	1888	2124	2360
27	353.0	21.2	735	858	981	1226	1471	1716	1961	2206	2452
28	363.1	21.5	756	882	1009	1261	1513	1765	2017	2269	2522
29	376.7	21.9	785	915	1046	1308	1570	1831	2093	2354	2616
30	387.1	22.2	806	941	1075	1344	1613	1882	2152	2419	2688
31	397.6	22.5	828	966	1105	1380	1657	1933	2209	2485	2761
32	411.9	22.9	858	1001	1144	1430	1716	2002	2289	2574	2861
33	422.7	23.2	881	1027	1174	1468	1761	2055	2349	2642	2936
34	433.7	23.5	904	1054	1205	1506	1807	2108	2410	2711	3012
35	448.6	23.9	935	1090	1246	1558	1869	2181	2492	2804	3116
36	460.0	24.2	958	1118	1278	1597	1917	2236	2556	2875	3195
37	471.4	24.5	982	1146	1310	1637	1964	2291	2619	2946	3274
38	483.1	24.8	1006	1174	1342	1677	2013	2348	2684	3019	3355
39	494.8	25.1	1031	1202	1375	1718	2062	2405	2749	3093	3436
40	506.7	25.4	1056	1231	1408	1759	2111	2463	2815	3167	3519
41	514.7	25.6	1072	1251	1430	1787	2145	2502	2860	3217	3575
42	526.9	25.9	1098	1280	1464	1829	2196	2561	2927	3293	3659
43	539.1	26.2	1123	1310	1498	1872	2246	2621	2995	3369	3744
44	551.5	26.5	1149	1340	1532	1915	2298	2681	3064	3447	3830
45	559.9	26.7	1166	1361	1555	1944	2333	2722	3111	3499	3889
46	572.6	27.0	1193	1391	1591	1988	2386	2783	3181	3579	3977
47	581.1	27.2	1211	1412	1614	2018	2421	2825	3229	3632	4036
48	594.0	27.5	1237	1443	1650	2062	2475	2887	3300	3713	4125
49	602.6	27.7	1255	1464	1674	2092	2511	2929	3348	3766	4185
50	615.8	28.0	1283	1496	1711	2138	2566	2993	3421	3849	4277
51	624.6	28.2	1301	1518	1735	2169	2603	3036	3470	3904	4338
52	637.9	28.5	1329	1550	1772	2215	2658	3101	3544	3987	4430
53	646.9	28.7	1348	1572	1797	2246	2696	3145	3594	4043	4493
54	660.5	29.0	1375	1605	1834	2292	2751	3209	3668	4128	4587
55	668.7	29.2	1395	1627	1860	2325	2791	3255	3721	4186	4651

CARRYING CAPACITIES OF RECTANGULAR DUCTS AND ROUND PIPES OF EQUAL FRICTION

DEPTH 6 IN.

WIDTH	FREE AREA	ROUND PIPE DIA.	VELOCITY-FEET PER MINUTE								
			300	350	400	500	600	700	800	900	1000
INCHES			CUBIC FEET PER MINUTE								
3	14.5	4.3	30	35	40	50	60	70	81	91	101
3½	19.7	5.0	40	47	54	68	82	95	109	123	136
4	22.9	5.4	48	56	64	80	95	111	127	143	159
4½	25.6	5.7	53	62	71	89	106	124	142	159	177
5	31.2	6.3	65	76	87	108	130	152	173	195	216
6	34.2	6.6	71	83	95	119	143	166	190	214	237
7	38.5	7.0	80	94	107	134	160	187	214	241	267
8	45.4	7.6	95	110	126	158	189	221	252	284	315
9	50.3	8.0	105	122	140	175	210	245	279	314	349
10	55.4	8.4	115	135	154	192	231	269	308	346	385
11	60.8	8.8	127	148	169	211	253	296	338	380	422
12	66.5	9.2	139	162	185	231	277	323	369	416	462
13	72.4	9.6	151	176	201	251	302	352	402	453	503
14	77.0	9.9	160	187	214	267	321	374	428	482	535
15	81.7	10.2	170	199	227	284	340	397	454	511	567
16	86.6	10.5	180	210	241	301	361	421	481	541	601
17	91.6	10.8	191	223	254	318	382	445	509	573	636
18	96.8	11.1	202	235	269	336	403	471	538	605	672
19	102.1	11.4	213	248	284	354	425	496	567	638	709
20	105.7	11.6	220	257	294	367	440	514	587	661	734
21	111.2	11.9	232	270	309	386	463	541	618	695	772
22	115.0	12.1	240	279	319	399	479	559	639	719	799
23	120.8	12.4	252	294	336	419	503	587	671	755	839
24	124.7	12.6	260	303	346	433	520	606	693	779	866
25	128.7	12.8	268	313	358	447	536	626	715	804	894
26	134.8	13.1	281	323	374	468	562	655	749	843	936
27	138.9	13.3	289	338	386	482	579	675	772	868	965
28	143.1	13.5	298	348	398	497	596	696	795	894	994
29	147.4	13.7	307	358	409	512	614	717	819	921	1024
30	151.7	13.9	316	369	421	527	632	737	843	948	1054
31	156.1	14.1	325	379	434	542	650	759	867	976	1084
32	160.6	14.3	335	390	446	558	669	781	892	1004	1115
33	165.1	14.5	344	401	459	573	688	803	917	1032	1147
34	169.7	14.7	354	412	471	589	707	825	943	1061	1179
35	174.4	14.9	363	424	484	606	727	848	969	1090	1211
36	179.1	15.1	373	435	498	622	746	871	995	1119	1244
37	181.5	15.2	378	441	504	630	756	882	1008	1134	1261
38	186.3	15.4	383	453	518	647	776	906	1035	1164	1294
39	188.7	15.5	393	459	524	655	786	917	1048	1179	1311
40	193.6	15.7	403	470	538	672	807	941	1076	1210	1345
41	198.6	15.9	414	483	552	690	828	965	1103	1241	1379
42	203.6	16.1	424	495	566	707	848	990	1131	1273	1414

CARRYING CAPACITIES OF RECTANGULAR DUCTS AND ROUND PIPES OF EQUAL FRICTION

DEPTH 12 IN.

WIDTH	FREE AREA	ROUND PIPE DIA.	VELOCITY-FEET PER MINUTE								
			300	350	400	500	600	700	800	900	1000
INCHES			CUBIC FEET PER MINUTE								
2½	25.5	5.7	53	62	71	86	106	124	142	159	177
3	31.2	6.3	65	76	87	108	130	152	173	195	216
3½	37.4	6.9	78	91	104	130	156	182	208	234	259
4	43.0	7.4	90	104	119	149	179	209	239	269	299
4½	49.0	7.9	102	119	136	170	204	238	272	306	340
5	54.1	8.3	113	131	150	188	225	263	301	338	376
6	66.5	9.2	139	162	185	231	277	323	369	416	462
7	78.5	10.0	164	191	218	273	327	382	436	491	545
8	89.9	10.7	187	218	250	312	375	437	499	562	624
9	102.1	11.4	213	248	284	354	425	496	567	638	709
10	113.1	12.0	236	275	314	393	471	550	628	707	785
11	124.7	12.6	260	303	346	433	520	606	693	779	866
12	136.8	13.2	285	332	380	475	570	665	760	855	950
13	147.4	13.7	307	358	409	512	614	717	819	921	1024
14	160.6	14.3	335	390	446	558	669	781	892	1004	1115
15	169.7	14.7	354	412	471	589	707	825	943	1061	1179
16	181.5	15.2	378	441	504	630	756	882	1008	1134	1261
17	193.6	15.7	403	470	538	672	807	941	1076	1210	1345
18	203.6	16.1	424	495	566	707	848	990	1131	1273	1414
19	213.8	16.5	445	520	594	742	891	1039	1188	1336	1485
20	227.0	17.0	473	552	631	788	946	1103	1261	1419	1577
21	237.8	17.4	495	578	661	826	991	1156	1321	1486	1652
22	248.8	17.8	518	605	691	864	1037	1209	1382	1555	1728
23	257.3	18.1	536	625	715	893	1072	1251	1430	1608	1787
24	268.8	18.5	560	653	747	933	1120	1307	1493	1680	1867
25	277.6	18.8	578	675	771	964	1157	1349	1542	1735	1928
26	289.5	19.2	603	703	804	1005	1206	1407	1608	1809	2010
27	298.6	19.5	622	726	830	1037	1244	1451	1659	1866	2074
28	307.9	19.8	641	748	855	1069	1283	1497	1711	1924	2138
29	320.5	20.2	668	779	890	1113	1336	1558	1781	2003	2226
30	330.1	20.5	688	802	917	1146	1376	1605	1834	2063	2293
31	339.8	20.8	707	826	944	1180	1416	1652	1888	2124	2360
32	349.7	21.1	729	850	971	1214	1457	1700	1943	2186	2429
33	359.7	21.4	749	874	999	1249	1499	1749	1998	2248	2498
34	366.4	21.6	763	890	1018	1272	1527	1781	2036	2290	2545
35	376.7	21.9	785	915	1046	1308	1570	1831	2093	2354	2616
36	387.1	22.2	806	941	1075	1344	1613	1882	2152	2419	2688
37	397.6	22.5	828	966	1105	1380	1657	1933	2209	2485	2761
38	408.3	22.8	851	992	1134	1418	1701	1985	2269	2552	2836
39	415.5	23.0	866	1010	1154	1443	1731	2020	2309	2597	2886
40	426.4	23.3	888	1036	1185	1480	1776	2073	2369	2665	2961
41	433.7	23.5	904	1054	1205	1506	1807	2108	2410	2711	3012
42	444.9	23.8	927	1081	1236	1545	1853	2163	2472	2781	3090
43	452.4	24.0	942	1099	1257	1571	1885	2199	2514	2828	3142
44	463.8	24.3	966	1127	1288	1610	1993	2255	2577	2899	3221
45	471.4	24.5	982	1146	1310	1637	1964	2291	2619	2946	3274
46	483.1	24.8	1006	1174	1342	1677	2013	2348	2684	3019	3355
47	490.9	25.0	1023	1193	1364	1704	2046	2386	2727	3068	3409
48	498.8	25.2	1039	1212	1386	1732	2078	2425	2771	3118	3464
49	506.7	25.4	1056	1231	1408	1759	2111	2463	2815	3167	3519
50	518.7	25.7	1081	1260	1441	1801	2161	2521	2882	3242	3602
51	526.9	25.9	1098	1280	1464	1829	2196	2561	2927	3293	3659
52	539.1	26.2	1123	1310	1498	1872	2246	2621	2995	3369	3744
53	547.4	26.4	1140	1330	1521	1901	2281	2661	3041	3421	3802
54	555.7	26.6	1158	1350	1544	1930	2316	2701	3087	3473	3859
55	564.1	26.8	1175	1371	1567	1959	2351	2742	3134	3526	3918
56	572.6	27.0	1193	1391	1591	1988	2386	2783	3181	3579	3977
58	589.6	27.4	1228	1433	1638	2047	2457	2866	3276	3685	4095
60	607.0	27.8	1265	1475	1686	2108	2529	2951	3372	3794	4216
62	624.6	28.2	1301	1518	1735	2169	2603	3036	3470	3904	4338
64	642.4	28.6	1338	1561	1785	2230	2677	3123	3569	4015	4461
66	660.5	29.0	1376	1605	1835	2293	2752	3211	3670	4128	4587

It's THERMO-DRIP for my money.....

...because this STAINLESS STEEL Humidifier puts and Keeps profits in my pocket"

It takes ALL these features to end Humidifier Service Calls

1. Feed valve of metal that will resist chemical action of hard water. (*Thermo-Drip has Monel metal valve and valve needle—utmost resistance to rust, corrosion and pitting.*)
2. Design that keeps feed valve COOL at all times to insure against flooding of pans and floors. (*Thermo-Drip valve, in open yoke, stays cool always; consequently, lime will not lodge on seat to cause valve to stick, clog or remain partially open.*)
3. Light gauge metal vapor pan for quick heat transfer and speedier evaporation. (*Thermo-Drip's 24-ga. stainless steel pan—uncoated—is matchless for this service.*)
4. Durability of pan metal without sacrificing lightness. (*Thermo-Drip pans are made of Armco stainless steel; 'nuf sed!*)
5. Freedom from mechanical parts, wiring and gadgets. (*Thermo-Drip has none of these; it is floatless, non-electrical, entirely self-contained and self-regulating.*)
6. Ease of water feed adjustment for individual home requirements. (*Initial setting of Thermo-Drip takes only a minute; convenient adjustment wheel at front varies drip from valve to suit homeowners' needs.*)
7. Convenience in cleaning pans. (*Thermo-Drip pan can be unhooked and removed in one minute. No disturbing of water line or other connections; no straining or tugging to get pan in or out of bonnet.*)

What makes furnace men—thousands of them—say, "It's THERMO-DRIP for my money"? Several things!

First, it is plain to them that a steady parade of water drops to a hot pan surface is the better way to feed water for vaporization . . . that a humidifier which steps up or throttles the drip feed automatically according to fluctuations in furnace heat is the more scientific way to keep moisture constantly balanced with temperatures . . . and that a mere sheath of water in a vapor pan produces faster evaporation than if the pan were brim full. These exclusive THERMO-DRIP features speak with absolute conviction when furnace men present them to furnace operators.

Second, they know that the stainless steel construction of the THERMO-DRIP Humidifier—another plus feature—tells customers and prospects in unmistakable terms that many years of service can be expected from their investment. This metal alloy gives homeowners every assurance that they're getting their money's worth; it quickens the sale, increases profits.

Third, these thousands of furnace men know, too, that the THERMO-DRIP Humidifier can be sold, with substantial profit from each installation, at a price that attracts the vast small home market. And they're cashing in on this popular humidifier now when furnace sales are at low ebb.

Join this big army of THERMO-DRIP boosters. Tie to this fast-selling, quality humidifier in 1940. It will put—and keep—profit in your pockets!

AUTOMATIC HUMIDIFIER CO.
18th & Main Sts. • Cedar Falls, Iowa

That's why You'll be Money ahead when you

Equip with THERMO-DRIP

TAKE THE SURE WAY to increased equipment sales.

The GRAND RAPIDS FURNACE CLEANER gives you a profit from the cleaning and provides the opening wedge for *new equipment sales.*

The retail service and repair department can profitably fill in those dead spots selling extra repairs and NEW HEATING EQUIPMENT BEFORE COMPETITION ARRIVES.

Shown at Sixth International Heating & Ventilating Exposition, Cleveland, Ohio, January 22-26, 1940.

The GRAND RAPIDS FURNACE CLEANER is truly a ONE-MAN DE-LUXE VACUUM CLEANER. It represents the ultimate in mechanical construction. It is the most POWERFUL—finest operating machine with professional appearance which puts you over with your customer. Sturdily built to last a long time.

DOYLE VACUUM CLEANER COMPANY

GRAND RAPIDS MICHIGAN, U. S. A.

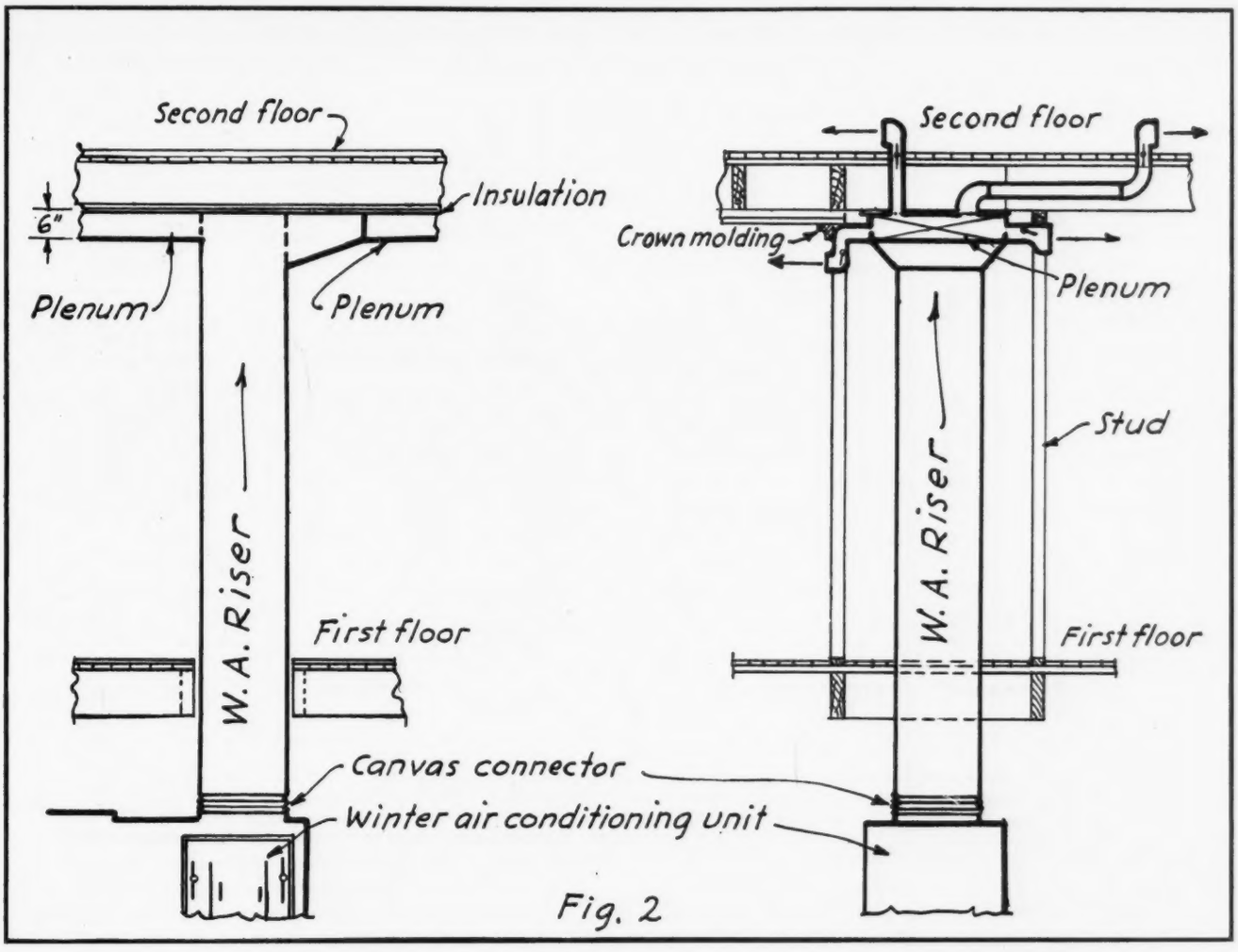

Fig. 2—The key to this idea is the high plenum which is carried up to the first floor ceiling in some concealed space. From this high plenum, branches run directly between joists to partitions and turn down for first floor registers and turn up for second floor registers. Accompanying floor plans show actual installations.

The Overhead Plenum System—

A practical method for reducing duct system costs in residences

By J. La Raus

Alfred L. Hart, Inc., Patchogue, N. Y.

General Electric Air Conditioning Distributor

THE plaintive cry of "Too Much Money" is a familiar complaint to the ears of sheet metal men and heating contractors whenever the question of residential duct work cost arises.

Realizing that in many cases the complaint was justified, especially in cases where the duct work far exceeded the cost of the heating unit, various attempts have been made to bring down the cost.

Many shops standardized their sizes and types of pipes and fittings and attempted to reduce costs by mass production or with cheap labor. Some tried prefabricated ductwork; while others used round tin or galvanized pipe for their basement work with flat pipe in the walls. The practice of panning joists, in order to save on labor and material, became prevalent. Velocities were increased and duct work decreased.

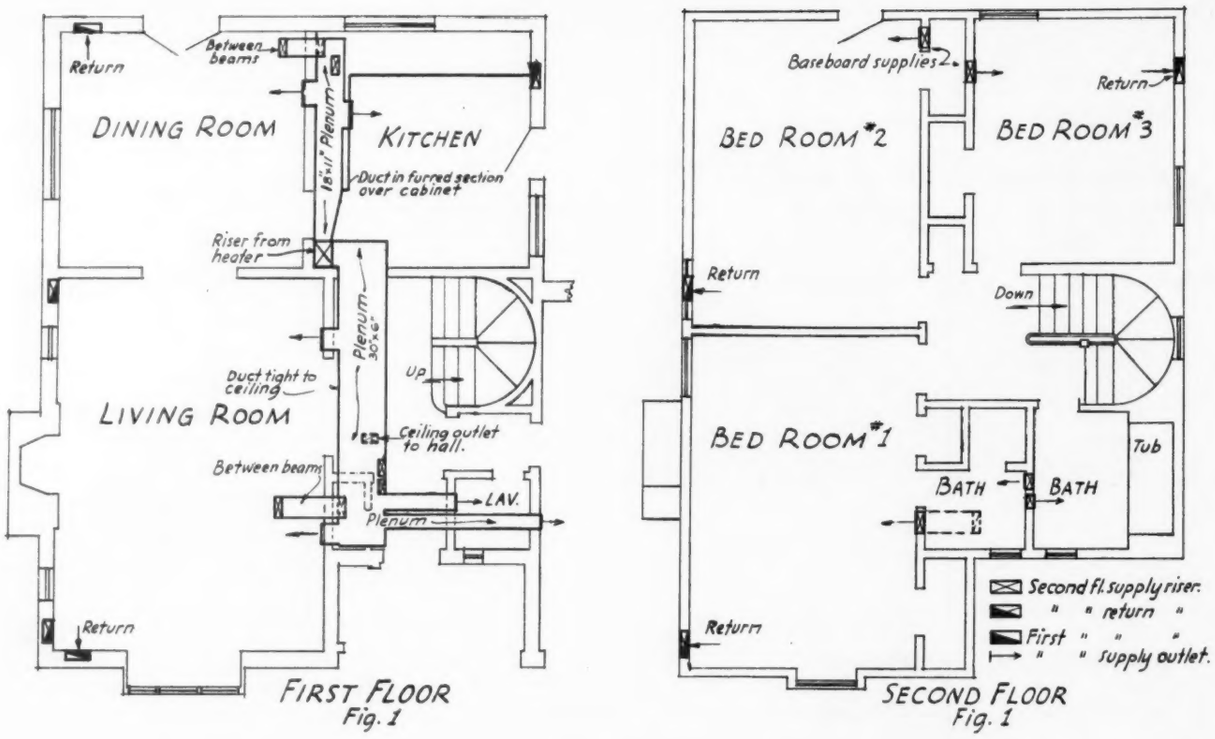

Fig. 1—Many of the houses in which the overhead plenum has been installed by Alfred L. Hart Company are compact, two-story buildings like the floor plans above. The builders cooperate by arranging equipment wherever possible to conceal the ducts. This typical plan shows the simple horizontal plenum and the short branches. Metal quantities are reduced and fittings are practically eliminated. The branch through the first floor lavatory heats the garage.

In short, everything and anything has been attempted to bring down costs, in many cases with drastic reduction in the efficiency of the heating system and in some cases making them almost inoperative.

Along with everyone else, we have been working to bring down the cost of duct work. The result of our efforts has been the "Overhead Plenum System for Residential Use." About 300 installations have been completed in the last year and every one has worked perfectly.

A typical floor plan for a house having such an "Overhead Plenum" system is shown in Fig. 1.

The "Key" Central Riser

A central riser is carried from the supply opening of the heating unit in the basement, to the ceiling of the first floor where it joins the main plenum chamber. The riser is usually carried through a closest or some unused corner of a room, preferably the kitchen. In Fig. 1, the plenum consists of a 6 by 30-inch duct along the hall, and an 18 by 11-inch duct in the section over the closet in the kitchen.

Branch Takeoffs

The supply outlets are tapped straight out of the side of the plenum, just below the ceiling, either with a short collar or dropped about 6 inches with a sharp offset below the crown molding. (See Fig. 2.) The second floor supplies are tapped off the top of the plenum or from the sides, whichever is more convenient, and are carried up to the baseboard level. They may also be carried to a point high on the wall if desired, which will allow for proper distribution if cooling is added later.

Volume dampers or squeeze dampers are placed in each register head to control the system, and may be reached with a rod through the register.

The returns are taken from each room in the usual way, and are connected to the unit in the basement by a simple duct system. No returns are taken from the bath rooms or kitchen. Dampers are also placed in each return register head to help balance each system.

In Fig. 3, another typical floor plan is shown.

In this case there was no central hall through which the plenum could be carried. Instead it was run through into the garage and was insulated with a 2-inch blanket of rock wool by the builder before furring it in.

Second Floor Branches

The second floor outlets were carried between the floor joists to the partition overhead. In cases where there is a long run between joists, the duct should be slightly oversized to keep the resistance down. It may be noticed that in the first floor lavatory a ceiling plaque was used. This was done because it was more convenient in this case than a side wall outlet. A colored tile board covered the duct opening and acted as a splash plate.

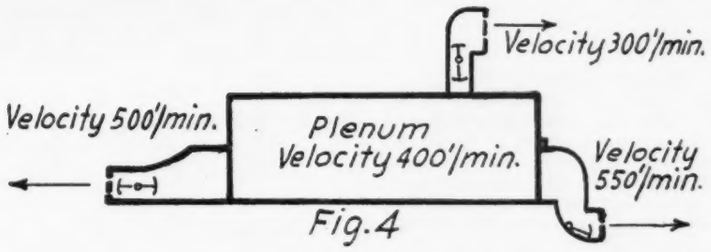

Fig. 4—The cross section of a typical horizontal plenum shows enlarged the method of taking branches off the plenum. There are no complicated fittings or transitions. Volume and velocity are controlled by the branch size and with the stack head volume damper. The first branch section has the area for the volume required calculated at plenum velocity.

In designing such a system a velocity of 400 feet to 450 feet per minute is maintained in the plenum. As each part of the plenum is tapped off the riser, the opening from the riser and the plenum itseslf is proportioned to the amount of air that is to be handled in each section. The air to be supplied to each outlet is determined from the heat loss of each room. The size of each outlet, in turn, is determined by the proportionate amount of air taken from the plenum. For first floor supplies, an outlet velocity is maintained at about 550 feet per minute. For the second floor outlets, the velocity was about 300 feet per minute. The velocity may be varied in any outlet by varying the size of the duct at the point it joins the plenum. See Fig. 4. This may be explained by the fact there is a reasonably constant pressure in the plenum. By varying the size of the opening from the plenum, the volume of the air varies in direct proportion. After a definite volume is taken off and the area of the duct is decreased at the point of discharge, a higher velocity will be had. If the area were increased over the size of the original opening, the velocity would decrease. This is important in designing the outlets for high wall or floor discharge.

It was found that by using this system, the cellar was always cold because there were no supply ducts exposed in the cellar to give off any heat. In many cases if a playroom was desired, an additional supply had to be added.

How System Saves Cost

We found that the above system could be installed for quite a bit less than the conventional tailor-made shop job.

A man and a helper could install a complete job, that is, riser, plenum, take-offs, return outlets, and return duct work in the basement, for a 20 to 25 outlet job, in 2½ days. This may be compared to the usual time of 1 to 1½ days for the standard roughing in job plus 3 to 4 days for the outside basement work.

In addition, the shop work and the material cost was cut almost in half since it was no longer necessary for the shop to make large, intricate fittings, duct turns, transition elbows, etc., and there no longer was a large

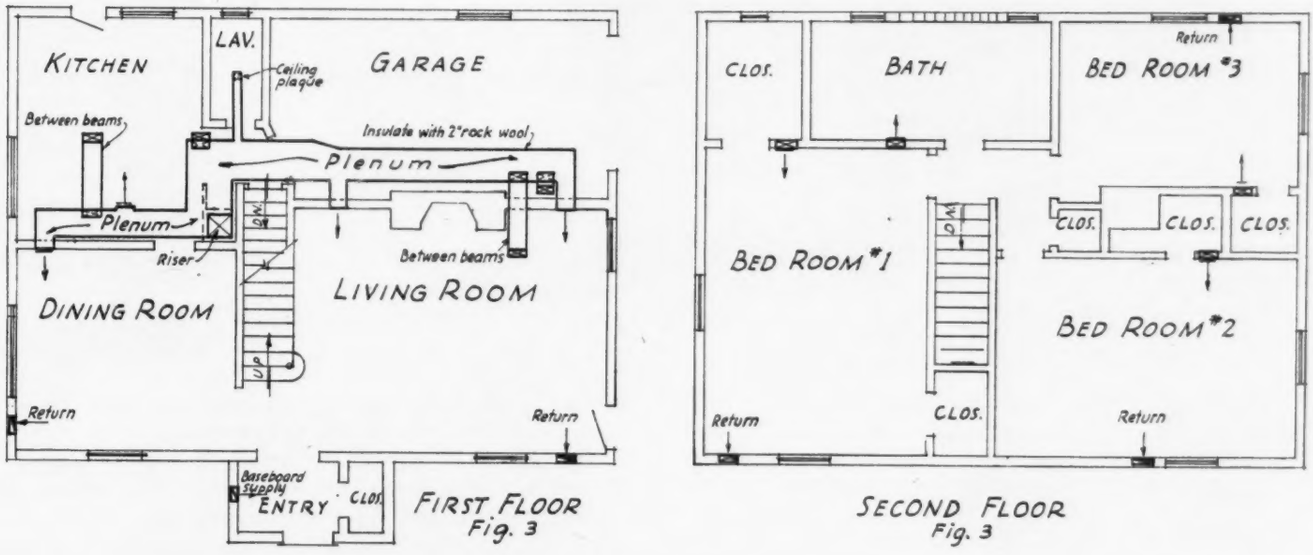

Fig. 3—The two floor plans above show a variation in a small house. Note that the largest air volume goes to the right, while the smaller volume going to the left has its own plenum. One register (the vestibule) had to have a branch through the basement. In this plan the garage supplies space for the largest plenum.

Fig. 5—The question logically arises—"How does this idea meet the requirements of a large house?" The plan shows an overhead plenum in a large house, which is rambling as well as large. In this house the hall supplies space for the horizontal plenum and only in the dining room might a branch be cited as open to objection. Since the dining room ceiling is beamed, this duct is practically invisible. Placement of registers for proper air distribution is not slighted in the least. Despite size of the system there is no intricate fitting required.

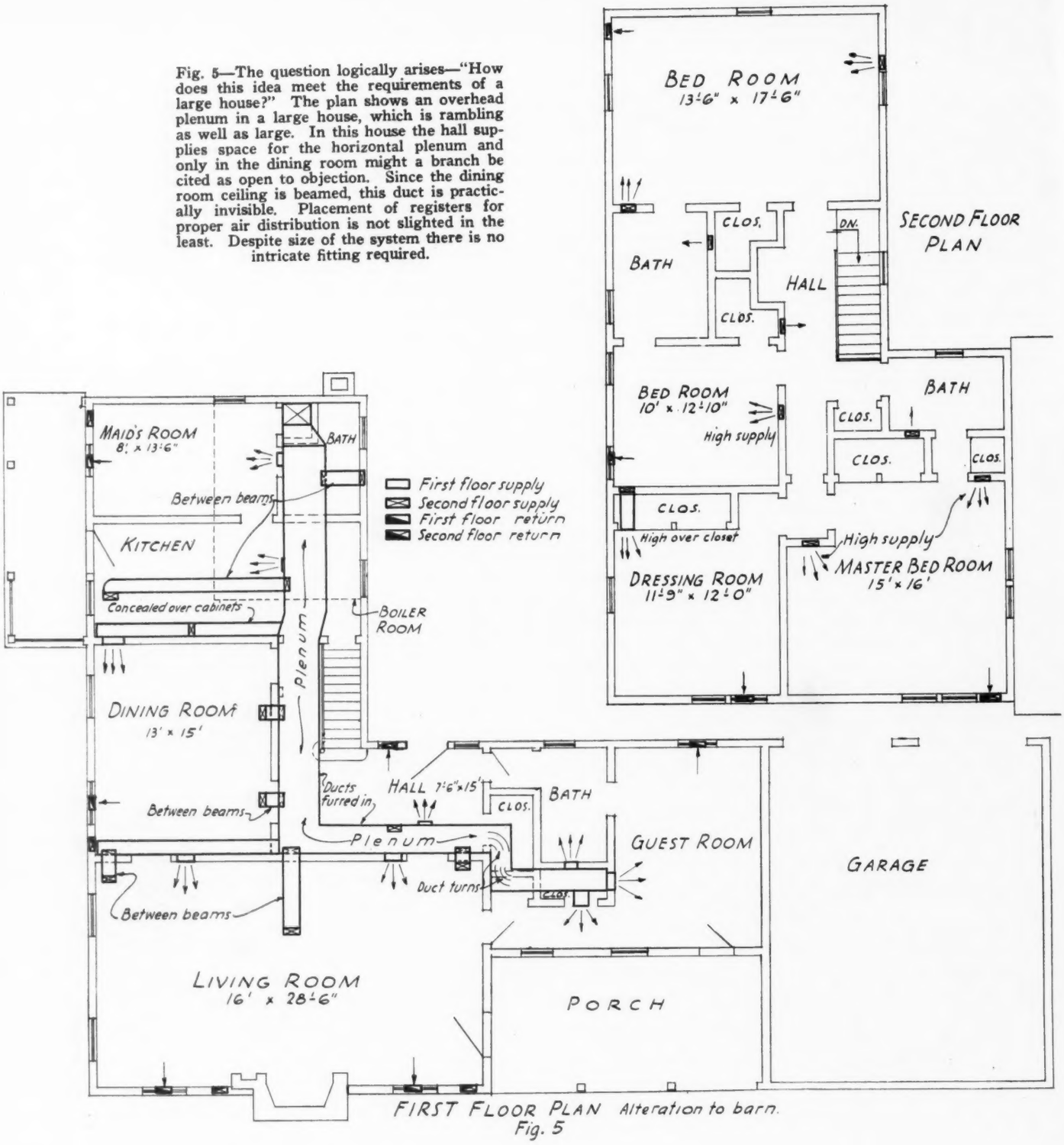

Fig. 5

amount of waste. Labor and material was saved because there were no individual risers to be installed for each room. Long, complicated duct systems were done away with. Travelling time to and from the job for roughing in, basement work, any extra parts, was saved because the job was completed at one time. The builder had less cutting to do and he did not have to alter his plan or go into special construction.

Any heat loss from the ducts is to the building itself and not to the cellar. The system lends itself to future cooling without any additional duct work.

The system is particularly applicable to very long houses that have a small heater room under one part of the building, and the rest is unexcavated. (See Fig. 5.) There will also be a considerable saving on insulation as well as on the back-breaking labor of installing duct work in an unexcavated section.

In addition, these systems are acceptable to the FHA.

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STOKER
HAND FIRED
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Available for oil and gas.

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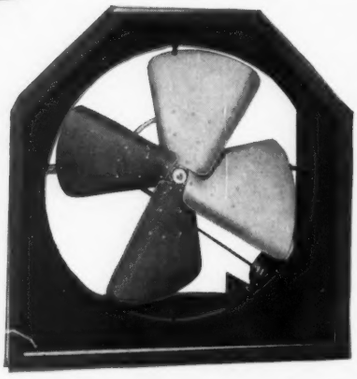
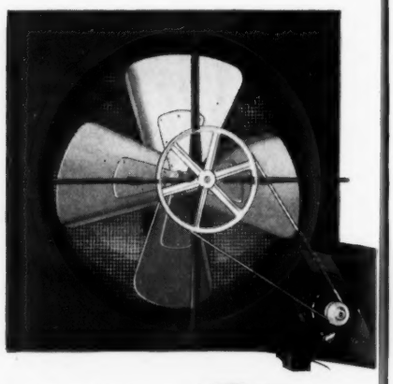
Made in two models—square cabinets and hexagonal top cabinets—sizes 30", 36", 42" and 48" diameter fan blades. Capacities 7,500 CFM to 20,500 CFM.

A substantially built ventilator operating silently at slow speeds to fill the fast growing requirements for the ventilation of homes and places operated for profit.





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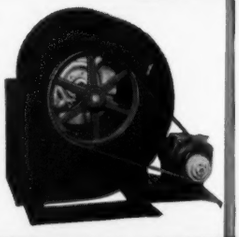

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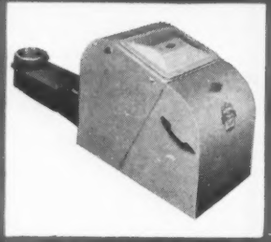
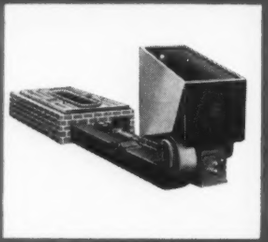


STOKOL HYDRAULIC
Exclusive hydraulic transmission—for all residential, commercial and industrial application. Anthracite and bituminous models.



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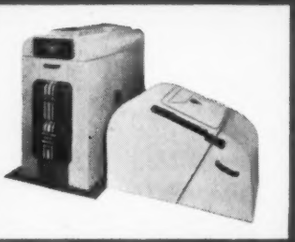
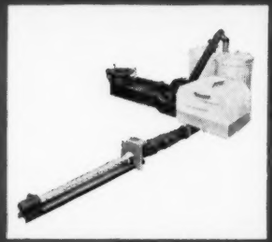
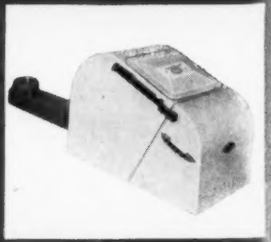
Commercial and Industrial STOKOLS available in capacities from 70 lbs. to 750 lbs. of coal per hour. Hopper and bin feed types.



STOKOL-HEAT Conditioner
in sizes up to 200,000 BTU at bonnet. (Also totally enclosed unit rated at 300,000 BTU.) Sizes up to 200,000 BTU also available with oil or gas burners.



BIN FEED STOKOLS
Universal type for anthracite shown. Also straight bin feeds and straight through bin feeds. Bin feeds in both the hydraulic and mercury lines.



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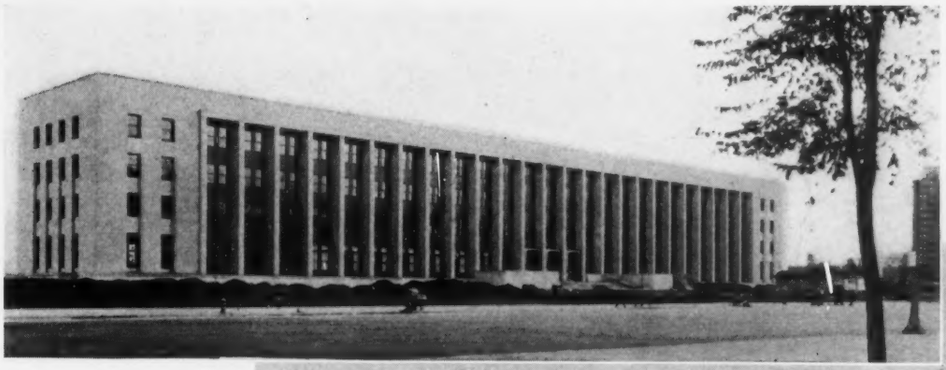
Designed especially for the small modern home, detached garage, domestic hot water heat and other installations using small amounts of coal.



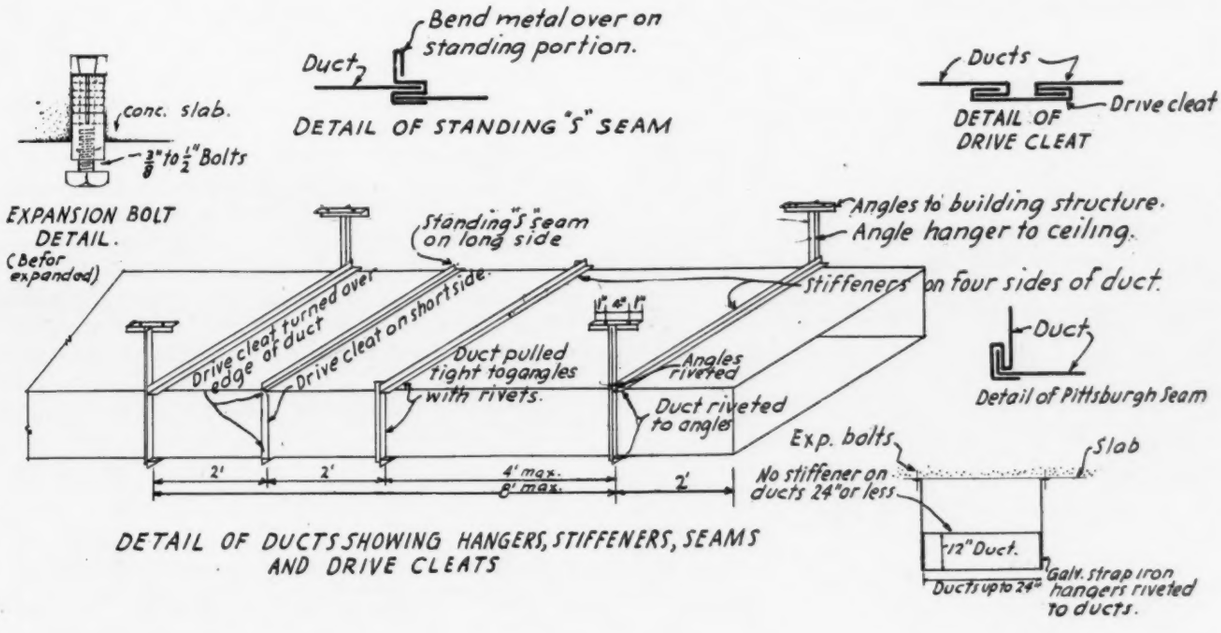
Above — Exterior; Right — Interior, of the new Chicago Park District office building. The interior view shows the twin, overhead supply grilles. Below — Details of duct construction showing expansion bolts, angle hangers and rigid duct reinforcement explained fully in the text.

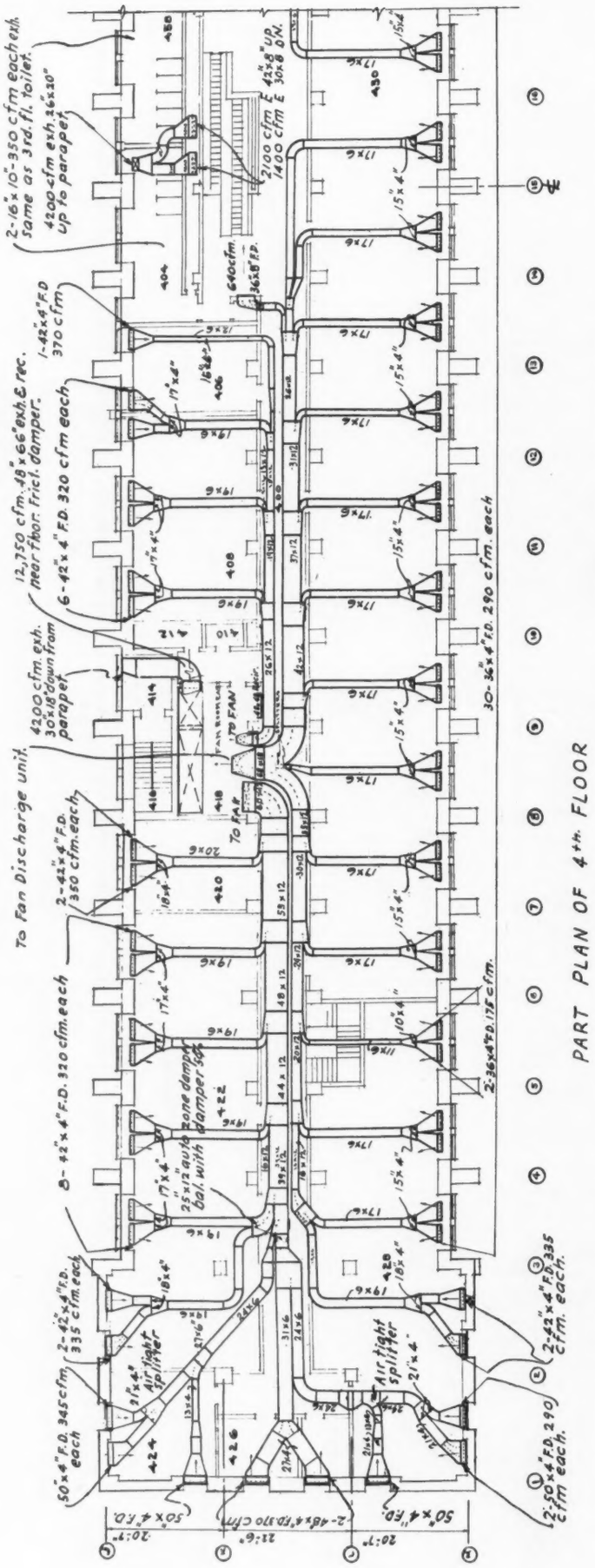
115 Tons of Iron—Every Pound Interesting

PERHAPS the largest, and unquestionably one of the most interesting, air conditioning systems completed in the Chicago area in 1939 was installed by the Haines Company, Chicago ventilating and air conditioning contractors, in the new office building of the Chicago Park District.

Large, because the Haines Company fabricated and erected some 231,000 pounds of galvanized iron, black sheets and angle iron. Interesting because the system heats, ventilates and can be used for partial summer cooling with lake water; the air distribution system is thought to be the only one of its kind; zoning is complete for weather and for present or possible future occupancy; and there is incorporated in the system a number of advanced ideas on sheet metal construction.

The building is 60 feet wide, 440 feet long with four office floors and a full basement. Two main




PART PLAN OF 4th. FLOOR
To Fan Discharge unit.
4200 cfm exh. 30x18 down from parapet
2-42"x4" F.D. 320 cfm each
8-42"x4" F.D. 320 cfm each
12,750 cfm. 48"x66" exh. & rec. near floor. Fricl. damper.
6-42"x4" F.D. 320 cfm each
1-42"x4" F.D. 370 cfm
2-16"x10"-350 cfm each exh. same as 3rd. fl. toilet.
4200 cfm exh. 36x30" up to parapet
2100 cfm & 1400 cfm
30-36"x4" F.D. 290 cfm. each
2-36"x4" F.D. 175 cfm.
2-42"x4" F.D. 335 cfm. each
2-50"x4" F.D. 290 cfm. each
50"x4" F.D. each
2-48"x4" F.D. 370 cfm
Air tight splitter
25"x12" auto bal. with damper set
Zone damper
To FAP
To FAN

supply systems and two main exhaust systems serve the building as a whole. In addition, there are sixteen booster fans for the main building and four independent fan systems serving special sections such as the Board Room, vaults, kitchen, etc. The system is arranged so that each main supply fan is augmented by eight booster fans located on the second and fourth floors. Each booster fan, in turn, serves one exposure of one floor.

Air Distribution System

The unusual air distribution system previously mentioned, can be studied from the typical floor plan. On the supply side, the air from one of the main supply fans comes up to the floor through risers, then through the booster for each particular area and passes into the space served. The building is so arranged that there is, on each floor, a central hall or hall space with private offices, small rooms or large open working areas along both sides of this central area.

For supply and exhaust purposes the building is roughly divided into the east and the west areas. The main supply and exhaust systems and the booster systems are also divided east and west. The booster fan rooms are roughly located about the center point of one half of the floor. To distribute the air for supply, the ducts leaving the booster fan rooms split east and west in one half the floor. These main supply lines are run through the central hall area. The plans show the two lines of supply for each floor, one line serving a north exposure and the other line serving the south exposure and the end exposure.

The floor plan also shows that the air leaving the hall mains is carried completely across the room to the outside walls. The branch then turns down 180 degrees in an elbow and connects with the supply grille. The main runs in the hall and the branches are all located behind the ceilings.

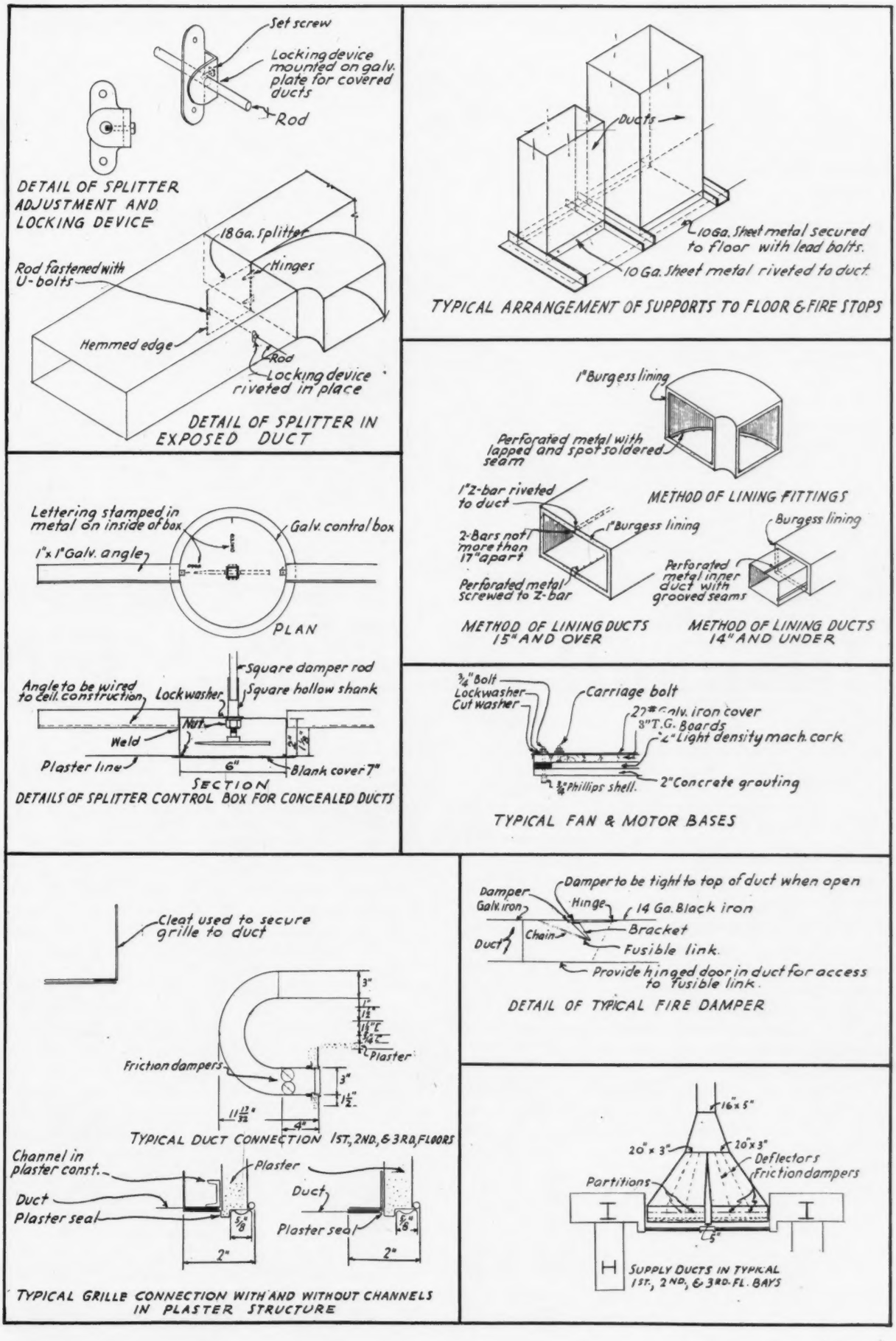
Reason for Twin Grilles

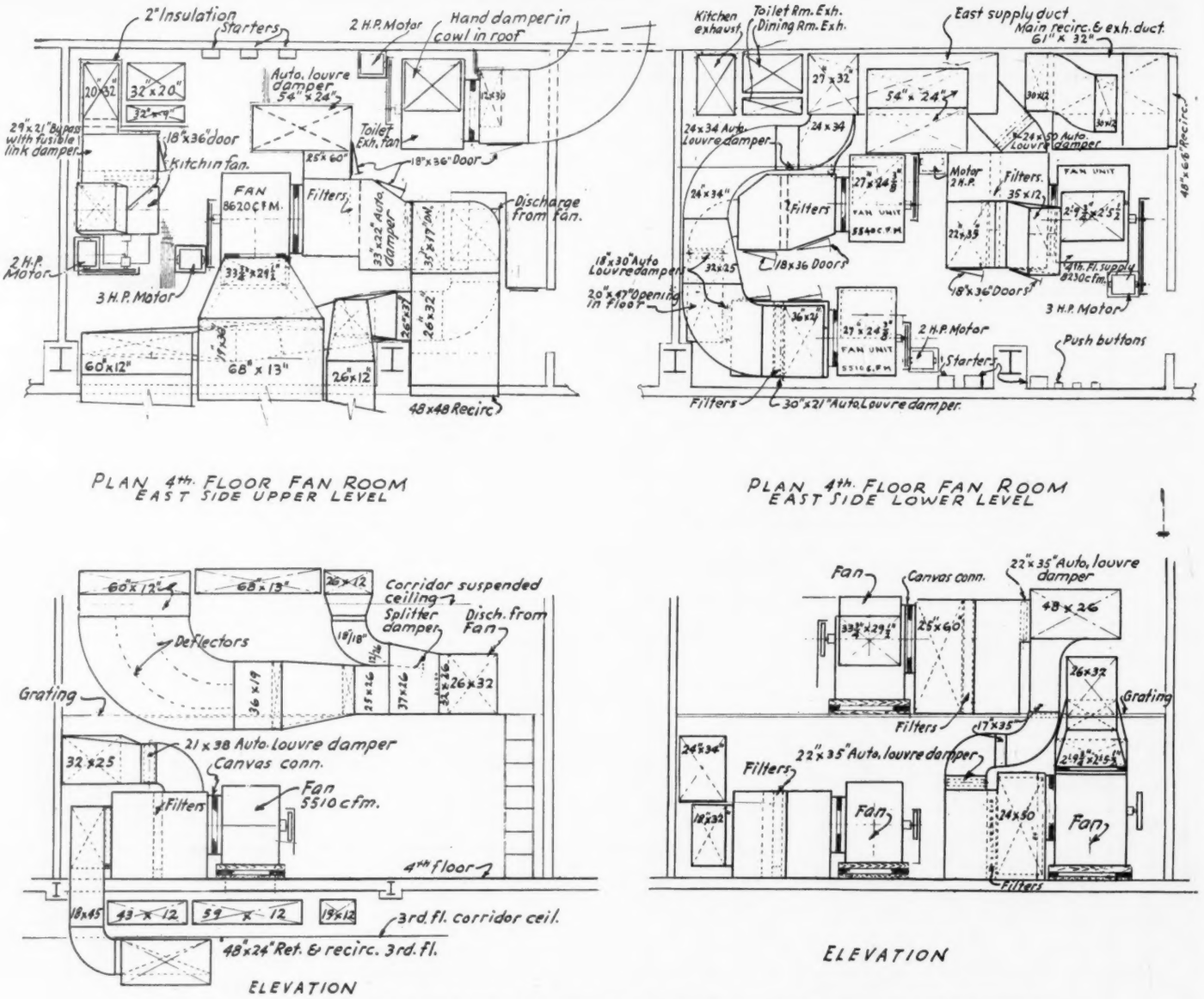
The plan probably raises the question—"Why the twin grilles and branch 'pants' and why the outside wall grilles?" The answer lies with occupancy. In planning the building, the designers provided means whereby the floor area can be divided into any number of offices, of practically any size, with each office having one window, or two windows or more windows and no matter where a partition may be put, even if it is between the pair of windows, there will be a supply grille in that space. This arrangement places a supply grille over practically every window in the building and no change possible to contemplate will necessitate additions to the duct system.

The additional amount of duct work necessitated by this arrangement is easy to visualize. More than

◆

Left—One-half of the fourth floor with a complete air distribution system from a booster fan room. Details of the interesting features are shown on the facing page.


Set screw
Locking device mounted on galv. plate for covered ducts
Rod
DETAIL OF SPLITTER ADJUSTMENT AND LOCKING DEVICE
18 Ga. Splitter
Hinges
Rod fastened with U-bolts
Hemmed edge
Rod
Locking device riveted in place
DETAIL OF SPLITTER IN EXPOSED DUCT
Ducts
10 Ga. Sheet metal secured to floor with lead bolts.
10 Ga. Sheet metal riveted to duct
TYPICAL ARRANGEMENT OF SUPPORTS TO FLOOR & FIRE STOPS
1" Burgess lining
Perforated metal with lapped and spot soldered seam
1"Z-bar riveted to duct
2-Bars not more than 17" apart
1" Burgess lining
Perforated metal screwed to Z-bar
METHOD OF LINING FITTINGS
Burgess lining
Perforated metal inner duct with grooved seams
METHOD OF LINING DUCTS 15" AND OVER
METHOD OF LINING DUCTS 14" AND UNDER
Lettering stamped in metal on inside of box
Galv. control box
1"x 1" Galv. angle
PLAN
Square damper rod
Angle to be wired to ceil. construction
Lockwasher
Square hollow shank
Nut
Weld
Plaster line
6"
Blank cover 7"
SECTION
DETAILS OF SPLITTER CONTROL BOX FOR CONCEALED DUCTS
3/4" Bolt
Lockwasher
Cut washer
Carriage bolt
27# Galv. iron cover
3" T.G. Boards
2" Light density mach. cork
3/4" Phillips shell.
2" Concrete grouting
TYPICAL FAN & MOTOR BASES
Damper
Galv. iron
Damper to be tight to top of duct when open
Hinge
14 Ga. Black iron
Chain
Bracket
Duct
Fusible link.
Provide hinged door in duct for access to fusible link.
DETAIL OF TYPICAL FIRE DAMPER
Cleat used to secure grille to duct
Friction dampers
Plaster
TYPICAL DUCT CONNECTION 1ST, 2ND, & 3RD FLOORS
Channel in plaster const.
Duct
Plaster seal
Plaster
Duct
Plaster seal
2"
2"
TYPICAL GRILLE CONNECTION WITH AND WITHOUT CHANNELS IN PLASTER STRUCTURE
16" x 5"
20" x 3"
20" x 3"
Deflectors friction dampers
Partitions
SUPPLY DUCTS IN TYPICAL 1ST, 2ND, & 3RD FL. BAYS



Plans and elevations of a two-level booster fan room illustrating the maze of duct work and housings in restricted area. Equipment was set and duct work was installed before room partitions were erected. This is the fan room for the system shown on the preceding pages.

one mile of duct work of all sizes is included in the system. The branches are similar in shape, but not at all uniform in sizes. For the job as a whole, of course, there are many duplications—the plans for any given floor showing numerous branches, to the same exposure, of the same dimensions. This did not work out quite as conveniently on the job as the plans indicate, because of complications caused by services of trades, so every line of pipe was individually checked for size and location on the job.

Generally the grilles are nearly of a size, therefore the 180 degree elbows serving each pair of grilles and the "Y" which connects to the branch were duplicated scores of times.

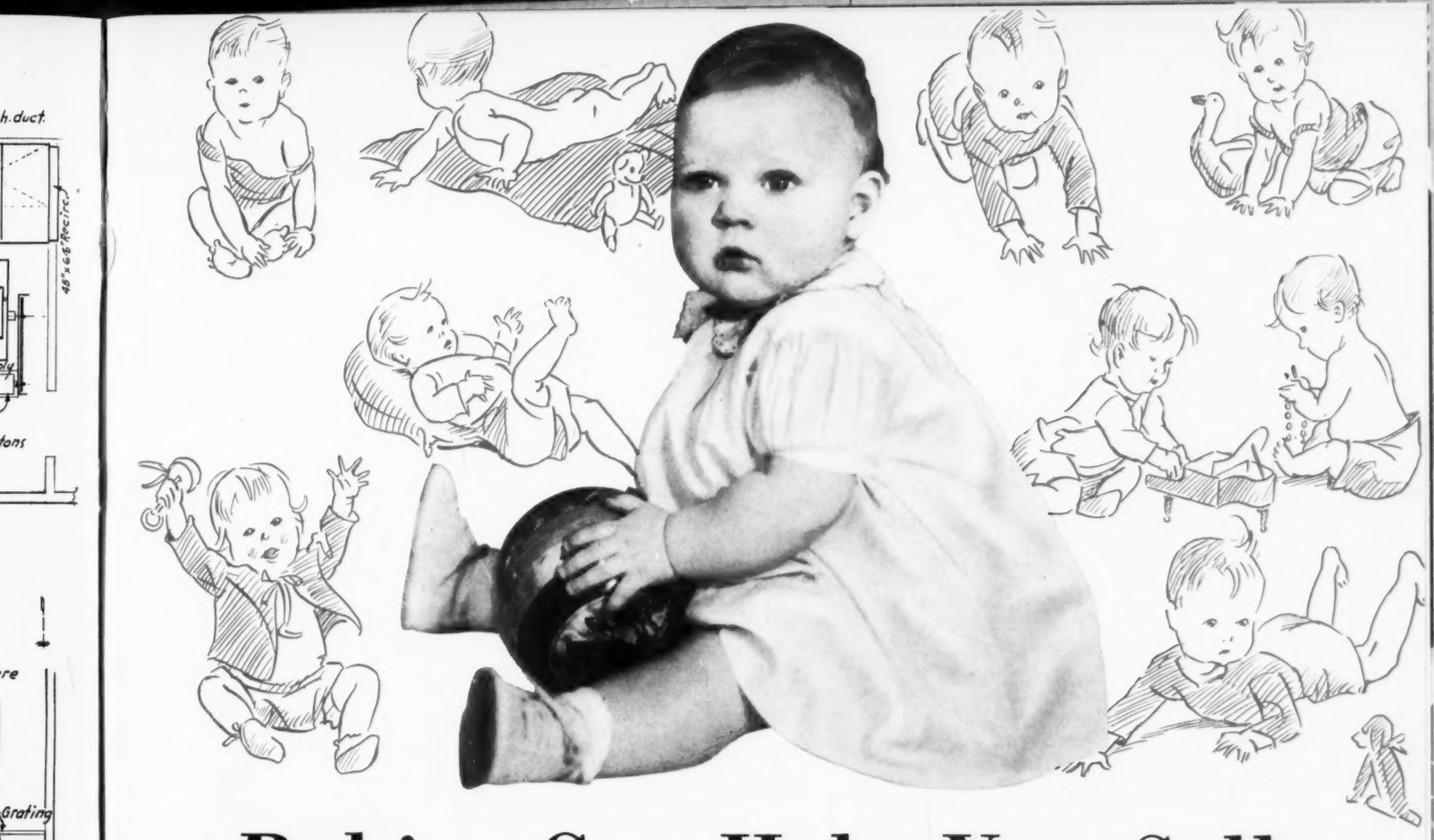
Fabrication and Erection Procedure

The fabrication and erection procedure devised is interesting. First of all, much of the metal installation was done during the first three months of 1939, when the building had no windows in place and was open to the winter winds of Lake Michigan a few hundred feet away. Despite this handicap work was stopped only a few days when temperatures dropped below 20 degrees.

To facilitate erection and because of duplications, or near duplications, as much of the work as possible was delivered to the job in complete duct sections. The 180-degree elbows were all made up as complete pieces. The "Y" pants were also made as complete sections. On the job, the elbow and the "Y" were connected and then the two-piece section was put in place. The branch was then run back to the hall way. Generally, after several branches along one wall were in place the portion of the main trunk serving these branches was erected. The building was ready for duct work on a schedule which gave whole areas of a floor to the sheet metal contractor.

All main pipe sections, all branches and offsets use flat grooved seams with standing seam "S" cleats top and bottom and drive cleats on the sides. All ducts are provided with galvanized stiffening angles on 4'-0" centers. The construction shows in one of the details. Note that there are intermediate

(*Continued on page* 180)



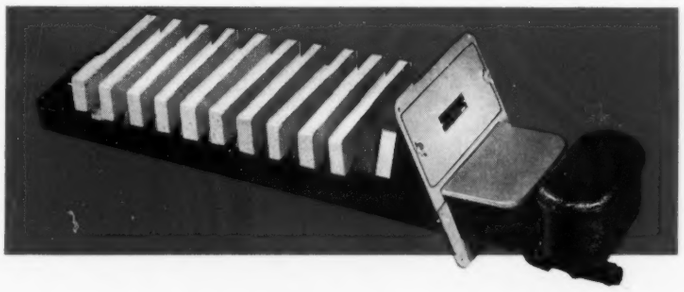
Babies Can Help You Sell Skuttle *Automatic* Humidifiers

A BABY'S health can be a vital factor in selling the home owner on the advantage of automatic humidification, because it doesn't take a mother long to recognize the fact that dry heat is harmful to her children's health.

The J. L. Skuttle Company has long recognized the importance of this fact and has written a sales manual for its dealers so that they can better sell their prospects.

It is dealer helps such as this that has built up Skuttle sales, and it is just one of the reasons the J. L. Skuttle Company is the largest manufacturer of automatic humidifiers today.

Because Skuttle has specialized in the manufacture of automatic humidifiers for 22 years, they have enjoyed the enviable reputation of always making a quality product, at a price that is low enough to be within the reach of the average home owner.



It is these advantages of dealer cooperation, quality construction, trouble-free performance plus their low prices that have made it possible for Skuttle dealers to realize the largest margin of profit on every humidifier unit they sell.

LET SKUTTLE INCREASE YOUR PROFITS

The illustration at left is the popular Skuttle D S humidifier with the improved adjustable collar and Ceramics (optional equipment) that has been a consistent profit-maker for dealers everywhere. Because its pan is made of drawn steel it has quick evaporating pick-up, while its porcelain enamel finish both inside and out guards against oxidation and insures easy cleaning. The famous Skuttle water supply valve, float and water line connector are standard equipment as well as 5 ft. of copper tubing. Sizes available are 20″ and 30″, but we will make any size unit to your specifications.

Why not let us send you a unit on approval together with the attractive sales manual and consumer literature, illustrated at right?

J. L. SKUTTLE COMPANY

1015 FRANKLIN ST. • DETROIT, MICH.

22 YEARS of SERVICE

"Sales have certainly stepped up, since we've taken on the Heil line!"

"Yes, sir! And lower installation and service costs give us a bigger profit on every sale!"

Heil presents a

five point profit line for 1940

Helps you close more sales easier and at a profit!

Five profit-builders for you — (1) Heil Activ-Flame Oil Burner . . . (2) Heil Activ-Flo Boiler Burner Unit . . . (3) Heil Activ-Air Conditioner . . . (4) Heil Water Systems . . . (5) Heil Water Softeners . . . Well-rounded line of attractive, economical models . . . Famous Heil construction features . . . to give you the advantage in competitive selling . . . keep your customers contented with uniform, healthful comfort . . . Get aboard with a company that accepts full responsibility for all its claims . . . Recommend and install Heil Equipment . . . Write today for free, colorful literature showing how Heil helps you enjoy a growing, profitable, trouble-free business.

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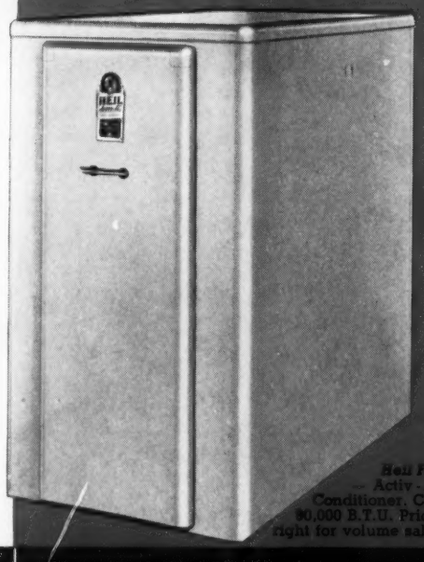
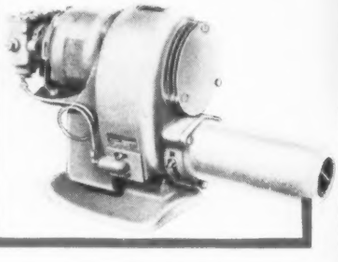
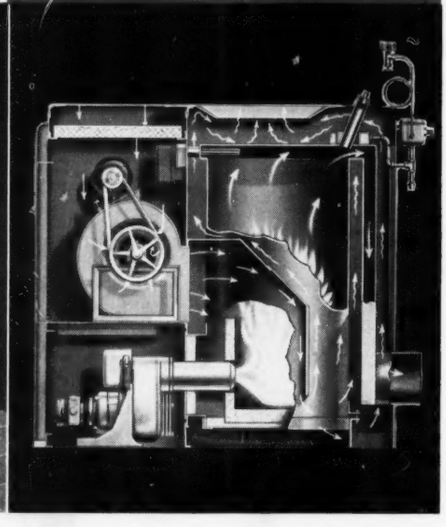
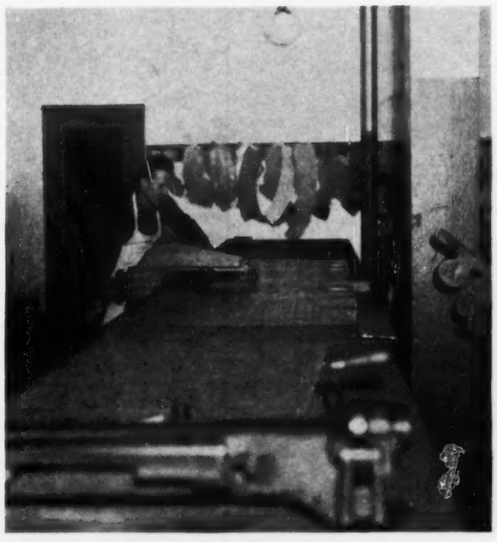
New

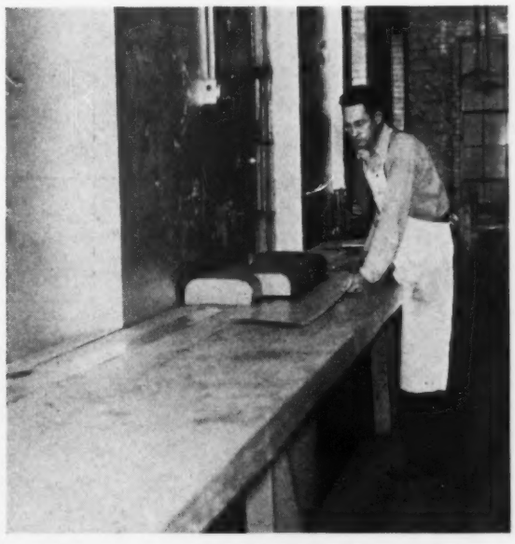


- *Below:* Heil Activ-Flame Oil Burner. Attractive, efficient, sturdy.
- *Center:* Heil Activ-Flo Boiler Burner Unit. High operating efficiency. Popular price.
- *Right:* Cross section of efficient Heil F 80 Activ-Air Conditioning Unit.









The "key" to duct cost savings is the Pittsburgh lock forming machine. So far as possible, ducts are constructed 8 inches deep. Each side has a "Pittsburgh" on each edge. Duct top and bottom are single sheets with an edge for the seam. Left—a 30-inch sheet is slit into three sides. Right—A side going through the Pittsburgh machine.

Simplification, in Each Step of Fabrication, Reduces Duct Cost 30%

IN INDIANAPOLIS, Indiana, banks, building and loan associations and other financial institutions control hundreds of homes lost by the original owners and now being offered for rent or for resale. From experience, the financial institutions found that a good, modern heating system is essential for steady occupancy or is a strong inducement to the prospective purchaser. The result is a very large volume of maintenance work, repair, replacement or complete modernization of these hundreds of heating systems.

What Customers Wanted

Midwest Heating and Service Company, Indianapolis, several years ago accurately visualized this market for its services and, accordingly, set about analysing the special requirements of this type of heating service customer. Investigation disclosed that the financial institutions were not particularly anxious to buy the very cheapest work. These institutions wanted to deal with a contractor in whom they could place implicit confidence. They wanted substantial design and workmanship. If the heating system in a certain house was inefficient, if the house was hard to heat, the institutions wanted a contractor who could analyze the trouble and recommend the changes necessary to satisfy the tenant or buyer.

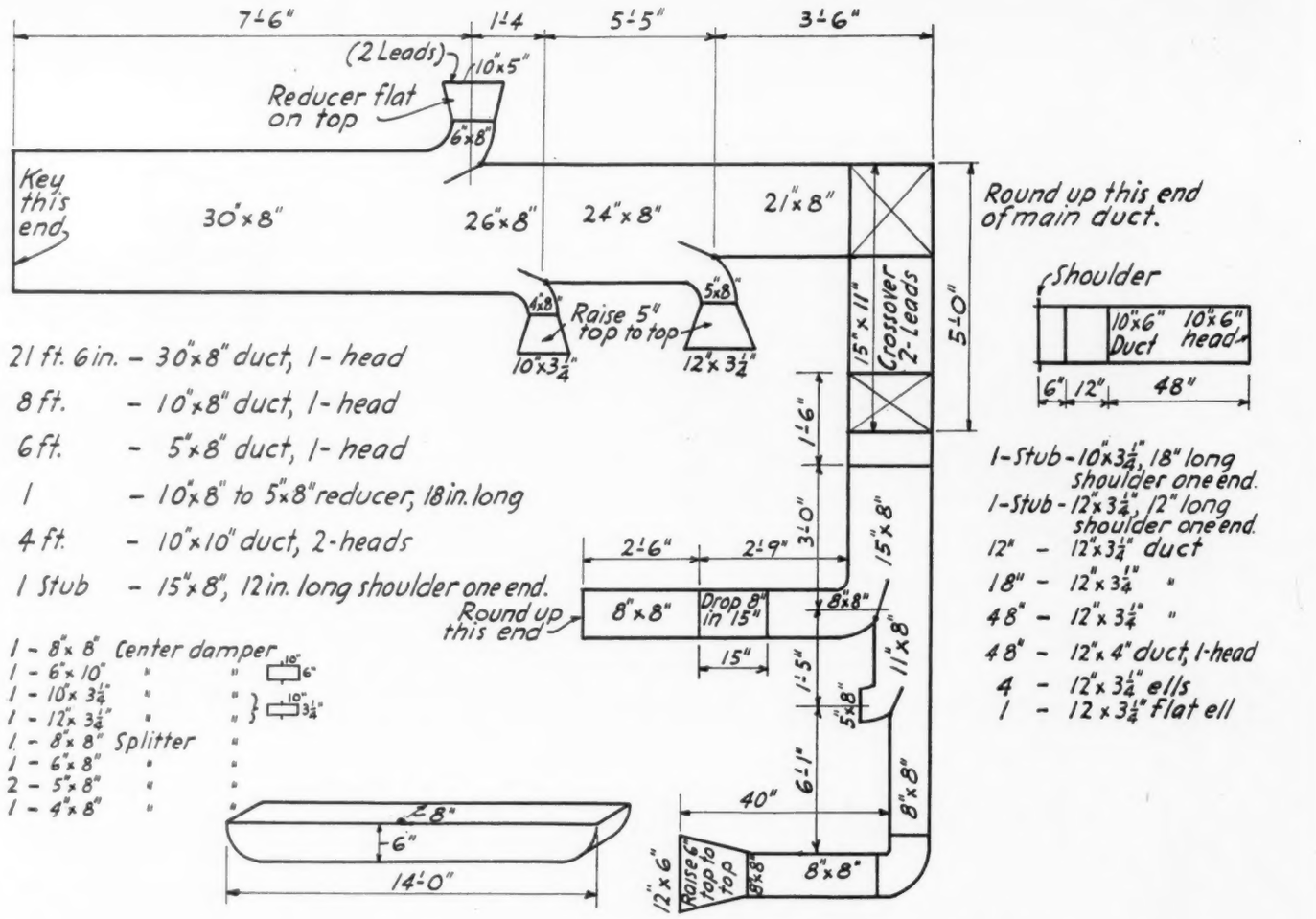
Having confidence in the contractor, if the contractor recommended additions to or changes in the existing system, the institutions wanted to feel sure that such changes would satisfy the occupants. If a completely new system was needed; if a modern, winter air conditioning system seemed advisable in accordance with the possible value of the property, the institutions wanted to feel sure that the contractor would appreciate the particular conditions and recommend a fair expenditure. A service which offered prompt, efficient attention to minor or major causes of complaint was highly essential.

Revamp Every Production Step

Midwest, using its established reputation for just such a service, has been unusually successful in getting and holding the work of these institutions.

Very early in this work, Midwest found that while the institutions demanded good workmanship they also appreciated all possible savings which could be passed along. So Midwest set about finding new and better ways to reduce costs of engineering, fabrication and installation. It also became apparent that the institutions were very much interested in winter air conditioning and, where costs were fair, preferred new winter air conditioning to extensive remodeling of out-of-date gravity furnace systems. The result of analytical thinking is that Midwest has found ways and means to install winter air conditioning at costs satisfactory to their clients. Midwest found, also, that these institutions approved winter air conditioning for new houses on which they loan money through the FHA plan.

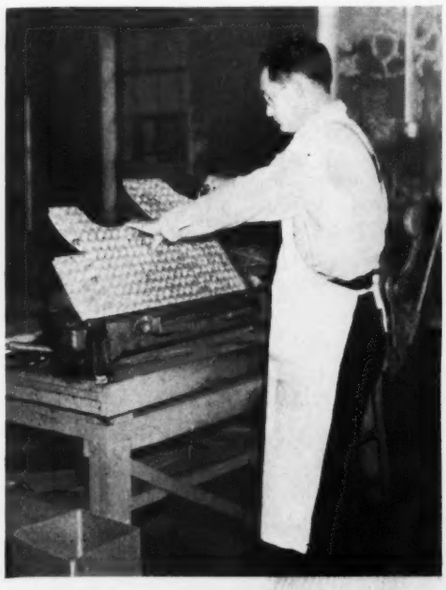
To establish this type of service, Midwest has revamped its entire office and shop procedure. The ultimate goal in each change has been to reduce

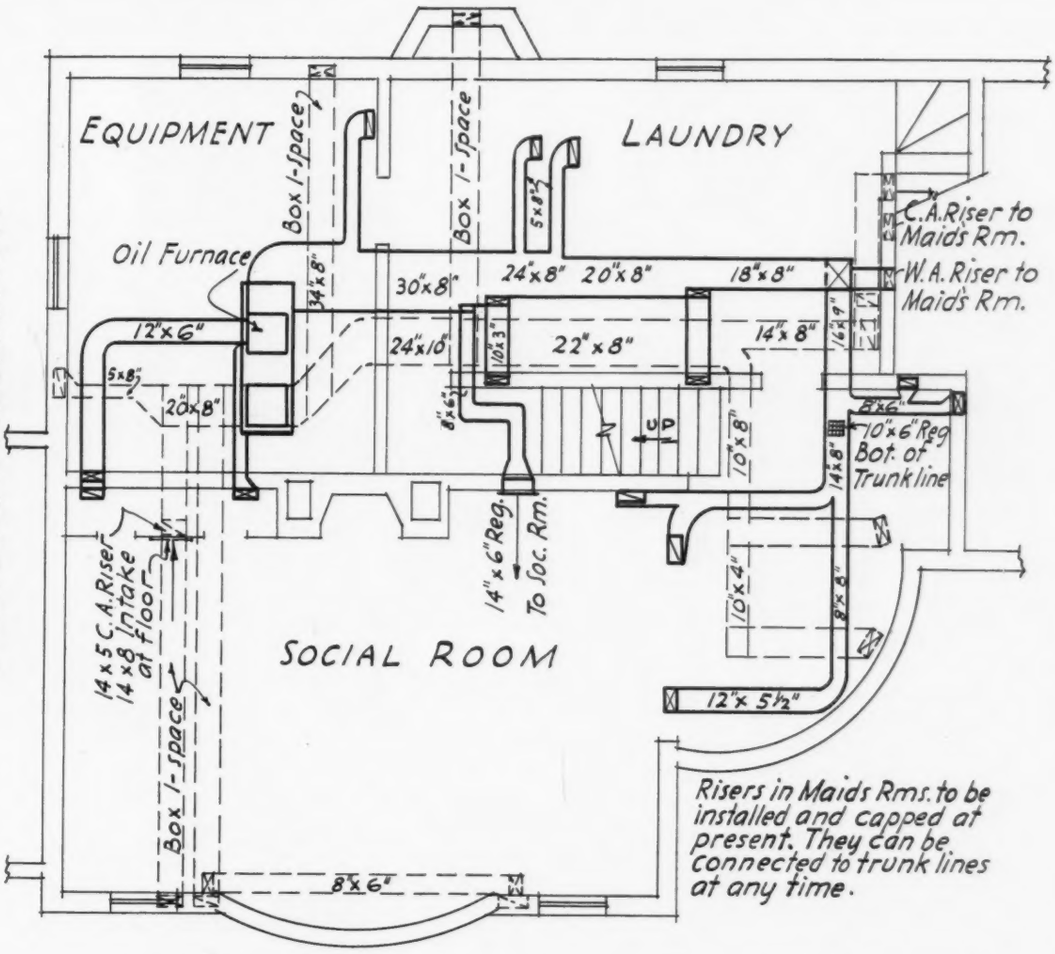


costs, but not to reduce profits. When a job is up for consideration, whether the job is remodeling an existing system or installing winter air conditioning in a new house, the engineering department makes a blue print showing the changes or the system recommended. On new houses this plan is prepared from the architects' drawings; on an old house this heating plan is made from actual measurements in the house.

After the contract is secured, if the house is new, the engineer goes to the house and measures the actual layout of the system. He sees whether or not the proposed system can be installed according to the preliminary plan; if not he revises the original plan in order to clear obstructions, take care of structural changes, etc. In doing this work, the engineer does all his measuring on the first floor joists. Openings are spotted and marked on the joists in chalk. Duct runs are laid out and branch take-offs, fittings, etc., are chalked on the joists. Actual distances are measured across the joists, working back to the furnace.

From this chalked system the final system is dimensioned, duct sections spotted, runs connected to the main and measured and the shop layout is prepared in rough pencil as shown in one of the illustrations. Scale on this shop drawing is not important, but measurements from base lines, sizes of all piping in inches are essential and are given, as shown.





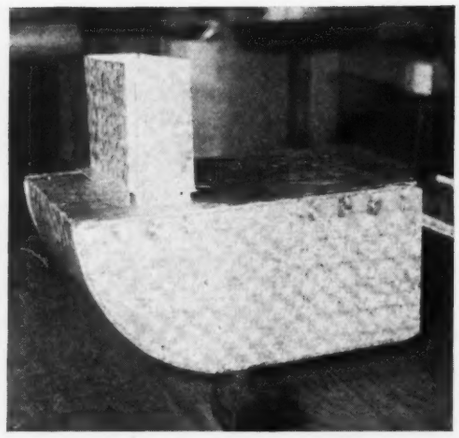
Right—Preliminary layout made on an architect's plan showing the heating system "proposed." So far as possible the system will "go in." Left—Is the actual system as laid out on the joists of the house. Note the changes required because of structural features. Note also base points from which shop measurements are plotted. The shop can divide any run into takeoff, straight section, elbow, etc., as expedient—but the TOTAL LENGTH must be maintained. Note engineer's notations indicating special changes in section, etc.

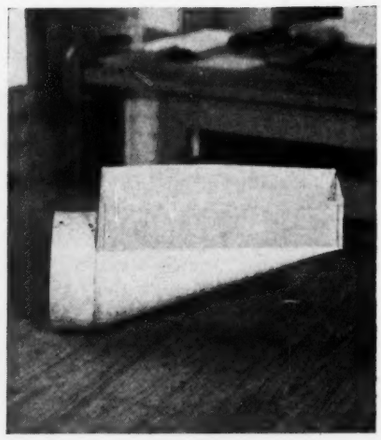
As the shop layout shows, branch lengths are shown from the outside of the stack elbow to the inside of the branch take-off. Lengths of main ducts and straight sections of branch pipes are indicated between fittings or changes in section. All changes in section or any rises or drops in pipes are carefully spotted and measurements given. When these runs of pipe are fabricated in the shop, the shop can maintain the overall dimensions but can divide the length into take-off, transition, or straight pipe according to expediency, or stock on hand, or otherwise.

Considerable time is saved by simplifying engineering and, indirectly, simplified engineering saves shop labor. For example, all pipes on the average job are sized to velocity—Midwest does not attempt to keep duct dimensions down to the last quarter of an inch. Velocities in stacks average 500 to 600 fpm; in mains 700 to 800 fpm, approaching 900 fpm at the bonnet; in returns 400 to 500 fpm is favored.

Considerable simplification has been worked out in sizes so that "specials" are kept at a minimum Most stacks are 3¼ by 10, 3¼ by 12, or 3¼ by 14 inches since Indianapolis construction favors 16 inches between centers for studs. Seventy-five per cent of all registers are 5 by 12 inches and in winter air conditioning systems are double deflecting type. Stacks are standardized in 5-foot sections of 28-gauge galvanized iron, since this length is easy to handle. Stack elbows are standardized as to types but are not stocked since Midwest can

The three pictures facing and the two on this page show a two-branch takeoff in process of fabrication the Midwest way. The cut piece (see text) is "scribed" with the special scriber shown. Straight edges are turned in the bar folder. Curved edges are made in the bench edger. Sides for the elbow are rolled on a hand roll. The length needed is measured with a tape on the top of the takeoff. Sides are joined to top and the two pieces to the bottom and the takeoff is completed. (About 25 minutes.)





Three fittings Midwest likes to use. Left—right angled stack from a round pipe branch. Center—Sled-runner end piece of a rectangular branch with the short stack section standing on the top. Note shoulder all around on the stack. A hole is cut in the top; the stack is pushed in and the edges bent up inside the duct. Right—Parallel stack from round branch takes this "pinch-end" transition. These three fittings are standard sizes. They are stocked if work gets slack, but they are so simple and can be made so quickly that immediate usage or for stock shows about the same cost.

fabricate a stack elbow in a few minutes from patterns described later.

At least 50 per cent of new and old houses accept round pipe branches. Midwest finds that cost of material is about the same for either round or rectangular, but cost of installation labor is about 25 per cent less for round pipe than for rectangular. Round pipe is not fabricated; it is bought along with adjustable elbows which further reduce the cost of installation. Round pipe branches are usually 6, 7, or 8 inches. If more than an 8-inch pipe is required, Midwest recommends two 6's or one 6 and one 7.

Pittsburgh Machine Key to Savings

Where rectangular branches are specified, Midwest carries its standard branch back to the main which puts the transition out in the clear where it can be handled easily. Also, this permits the branch take-off and transition to be made as one piece which saves installation labor.

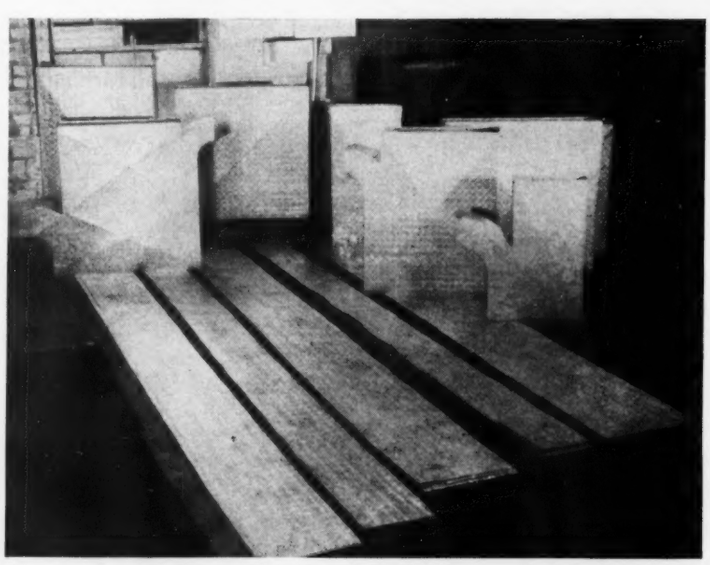
Savings in the cost of fabricating duct work have been given much attention. A very noticeable reduction in cost was accomplished by installing a Pittsburgh lock forming machine which puts locks on duct sides in a fraction of the time formerly required and leaves the brake free for other work. With the Pittsburgh machine as the basis for cost saving, Midwest makes all rectangular duct work as two sides, one top and one bottom. Each side carries a Pittsburgh seam top and bottom, the top and bottom duct sheets are edged for the Pittsburgh on the brake in long, straight sections and in a bench edger on fittings. (See photographs.)

Main and Branch Simplification

Main trunks are usually 8 inches deep. Thirty-inch wide sheets are passed through a rotary slitter (see photograph) to obtain three side pieces including metal for the Pittsburgh. Main trunk straight sections are made in 5-foot lengths so far as possible since the erecting crew of two men can handle a 5-foot section readily. All top and bottom sheets are cross broken for stiffening on duct widths 14 inches and over; and standing edge drive cleats are used on wider ducts for additional stiffening.

Where stacks come off the end of a trunk or off the end of a rectangular branch, Midwest likes the sled-runner-end section shown in one of the photographs. To utilize this section to fullest advantage a stub stack section has been worked out with a

(*Continued on page* 178)



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Typical pieces and sections for a small industrial, winter air conditioning, system. The strips on the floor are standard sides with the two Pittsburghs. The branch takeoffs are standard design and fabrication. Midwest's basic patterns for fittings can be used for either residential or small commercial installations.

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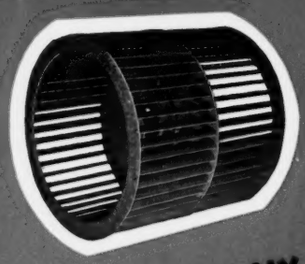


ANY CAPACITY—ANY SPEED*

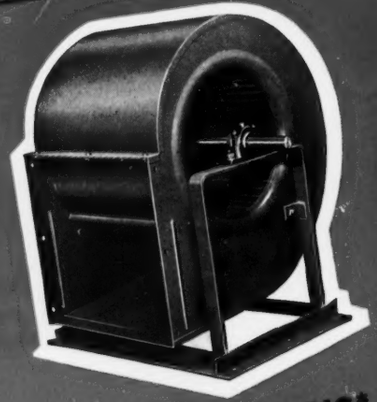
Clarage Wheels can be furnished in ten sizes and in a variety of widths in each size, thus meeting any capacity demand at any operating speed.

These Wheels are of the Double Multiblade Type as shown above, built with two sets of perfectly formed blades securely anchored to the center plate and rims. Each Wheel is BOTH STATICALLY AND DYNAMICALLY BALANCED—quiet, smooth-running and free from vibration.

Housings, too, in any of ten sizes can be furnished separately where required.

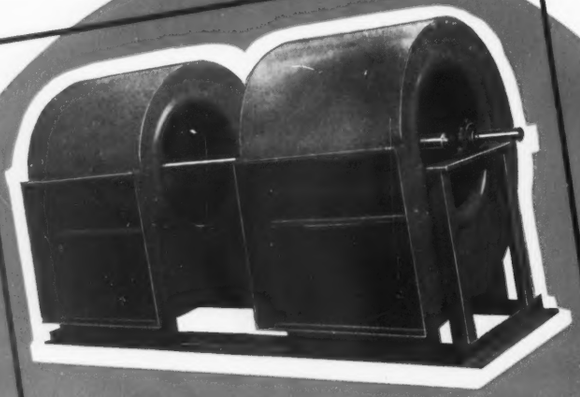
Even in These Small Units —the Same CLARAGE Quality Standards

Clarage is a dependable source of supply. This small fan equipment is backed by conservative engineering, and over a quarter-century of experience. It is built to the same standards of excellence which have made the larger Clarage air handling and conditioning products FIRST CHOICE of discriminating buyers the world over.



COMPLETE FANS*

A Complete Fan, offered in ten different sizes, consists of a Clarage Double Multiblade Wheel, Fan Housing, Shaft, Bearings, Bearing Supports and Base. Bearings are self-aligning and self-lubricating; a bronze-graphite type which requires filling of oil reservoir but once a season. The Shaft is of liberal size to insure ample strength and rigidity. The entire assembly is VERY COMPACT AND TAKES EXTREMELY SMALL SPACE. Cold air inlet boxes can be furnished as part of standard equipment.

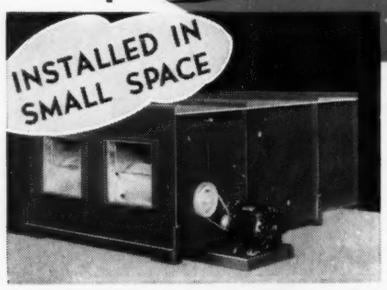


DUPLEX FANS*

A Duplex Unit, offered in ten sizes, consists of two Complete Fans mounted together on one base as shown above. Both wheels are mounted on one shaft turning on self-aligning, self-lubricating bearings.

All of these small Clarage Fans are EXCEEDINGLY QUIET IN OPERATION, when driven either by V-belt drive or direct connected to motor. This silent performance is assured by SLOW SPEEDS, perfectly balanced wheels, and the use of highest-grade bearings.

Write for Bulletin 33, giving full data including fan capacities. Better still, have Clarage engineers submit a recommendation covering your particular requirements.



Clarage Multitherm Conditioning Units (suspended and floor types) are ideal for retail stores, small restaurants, offices, etc. Furnished in various equipment combinations to give cooling, heating or complete air conditioning. Very compact; easily installed.
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How to Determine Required Stoker Capacity

By G. C. Ziliotto

BECAUSE of the many conditions under which stokers are called upon to operate, our knowledge of their performance can best grow from an exchange of the experiences of those engaged in the business of selling and installing them. We, who are in this business, may not have the facilities and the time to carry out extensive and accurate tests, but, on the other hand, we are in a position to make observations and comparisons regarding the performance of stokers under all kinds of conditions, too numerous to be encompassed by laboratory tests.

The performance of a stoker depends on many factors, each of which affects not only the performance in itself but also reacts on the other factors, so that if we make a change in any one of the factors we may, perforce, have to make changes in one or more of the others in order to secure the results sought.

In a stoker installation we have to consider the following factors: Maximum capacity required of the boiler or furnace; volume of the combustion chamber and distance from the top of the retort to the crown sheet; calorific value of the coal to be used, its ash content, ash melting point, amount of volatile in per cent, its burning characteristics as regards caking and coking, besides the lump sizes and the amount of fines in per cent; the draft available; and, finally but not least, the characteristics of the particular heating system the stoker is to fire.

The last mentioned factor is in reality the first one which must be considered in determining the required stoker capacity. Specifically, the type of heating system (i.e., whether it is warm air, steam, or hot water) may affect the selection of the size of the stoker as determined finally by the consideration of the heat losses from the building. The reason is that in a warm air system the transmission of the heat from the furnace to the rooms is much more nearly immediate than in either a steam or a hot water system. This is due to the greater specific (sensible) heat of the water, the still greater latent heat of evaporation, and the weight

and specific heat of pipes and radiators.

In a gravity water system, the large amount of water in the system and the weight and specific heat of pipes and radiators have such a retarding and dissipating effect that the temperature of the radiators lags behind the temperature in the boiler. A steam or a hot water system will require, therefore, a relatively larger stoker than a warm air system, especially if the room temperature is allowed to drop during the night. With steam or water heating a considerable time may elapse between the starting of the stoker and the production of enough heat to warm the radiators. During this time the room temperature will fall still farther and, therefore, if we want to maintain a close control over the room temperature, we shall have to be able to raise steam or the temperature of the water quickly after the thermostat calls for heat. With "on and off" firing this lag in the transmission of heat to the radiators becomes an important factor and should be taken into consideration when selecting the size of the stoker.

The Selection of the Stoker's Capacity

We have already stated that the capacity or size of a stoker is influenced by the type of heating system to which it is to be applied, but size will be determined, within comparatively narrow limits, by the heat losses from the building.

When we install a stoker for a new building as a part of the whole heating system, we usually have all the data from which to compute the Btu losses with a fair degree of accuracy. It is not so when the building is an old one and no construction data are available. We can, of course, measure the area of exposed wall, ceilings and floors, the glass surface, and the cubic contents, but when it comes to determining the heat transmission coefficient through the walls, top floor ceilings, and ground floors we have to guess or to depend on the information given us by the owner. Either one may be quite incorrect and, besides, measuring all the rooms is a task which consumes a good deal of time if the building is, for instance, a large apartment house. For these reasons the procedure for calculating the proper size of the stoker will differ in the two cases.

When we are in a position to calculate the Btu losses from the building, our problem is to select a stoker that can burn efficiently and without strain, either on its mechanical parts or on those exposed to the fire, the amount of coal that will balance these heat losses from the building, having consideration for the overall efficiency of the heating system and for the calorific value of the coal to be used. We can write the general equation:

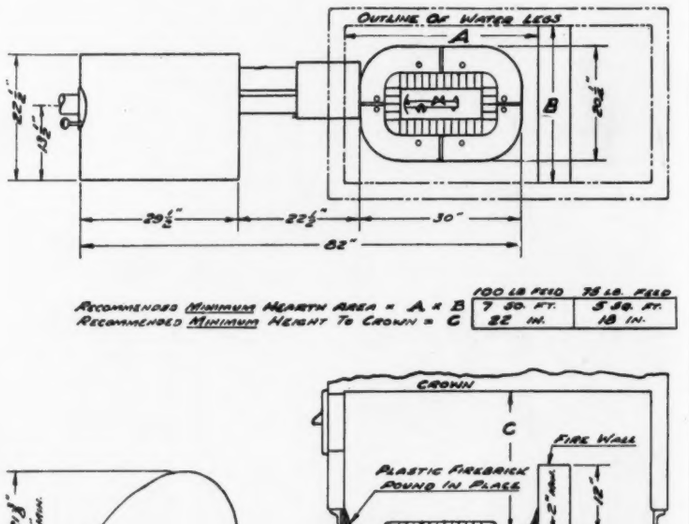
$$1) \ldots\ldots H = N \times C \times E \text{ or } N = \frac{H}{C \times E}$$

in which:

H = Btu per hour calculated heat loss from building
N = Number of pounds of coal burned per hour
C = Calorific value of coal in Btu per pound
E = Overall efficiency of heating system

If we know that a specific house has a heat loss of 60,000 Btu per hour when the outside temperature is —20 and the room temperature is 70 degrees and we assume that the coal used has a calorific value of 12,000 Btu per pound and the efficiency of the heating system is 65%, then the second formula gives us a maximum coal consumption per hour of 7.7 pounds.

It is always interesting and valuable to compute not only the hourly maximum consumption, but also the season's fuel consumption because the



Proper setting of retorts in fire-boxes is very important, particularly in larger furnaces and boilers. Above is the proper setting for a horizontal boiler or furnace. Note rear fire baffle.

owner will be more interested in the latter than in the former, and because it is easier to check the correctness of our assumptions and calculations from the knowledge of the total consumption for the heating season than from that of hourly maximum consumption.

The determination of the annual fuel consumption, within the limits of reasonable accuracy in such a complex process, is facilitated by the use of the degree-day tables which are to be found in any modern book on the subject of heating. The formula giving the annual fuel consumption is:

$$2) \ldots\ldots F = \frac{24 \times H \times D}{T_d \times C \times E}$$

in which:

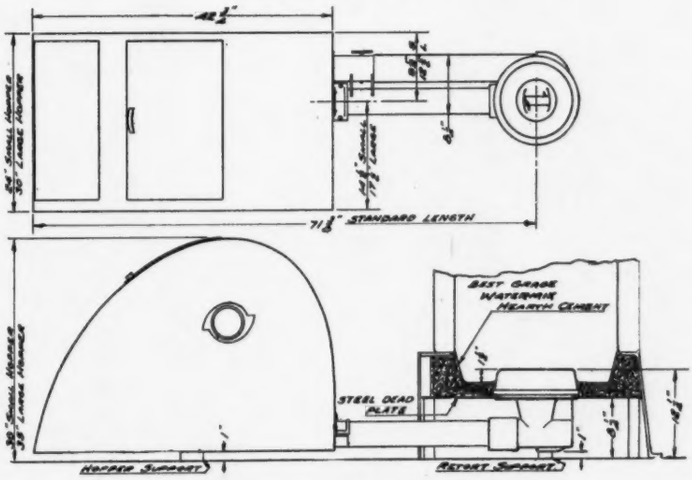
F = annual fuel consumption in pounds
24 = conversion factor from days to hours
D = degree-days for the locality
T_d = temperature difference used in computing (H)
H, C, and E as in equation (1)

T_d in our example is 90 degrees and if the location has 7372 degree-days, our heat loss is 60,000 Btu per hour, coal 12,000 Btu per pound, efficiency 65%, then we find that F = 15,130 pounds, or approximately 7½ tons. This figure is in line with average results obtained in actual installations and may be assumed to be correct. We should not, however, assume that the figure of 7.7 pounds maximum per hour found from our calculation can be taken as the basis for selecting the maximum capacity of the stoker. That figure is based on the assumption of continuous operation, whereas our stoker should not work continuously.

Capacity for Intermittent Operation

Manufacturers suggest that the total operating time for a stoker should be between 6 to 10 hours and during this time it should be able to supply the total heat loss from the building in 16 hours (the average heating period in hand firing). It follows, therefore, that its maximum capacity should be from 2.7 to 1.6 times as great, or, in our example, from 20 to 12 pounds coal feed per hour.

For quick figuring, we can assume that the capacity of the stoker, expressed by its maximum burning rate in pounds per hour, should be twice the number of tons of coal burned per season. Like all quick-figuring rules this one should be checked



In small furnaces or residential round boilers, the retort should be centered.

for the conditions existing in any specific locality as the number of degree-days will affect its validity, and should in any event be used **only** as a preliminary, quick estimate.

Capacity for Conversion Installation

In a conversion job we can proceed in the same manner as for a new job; that is, we can compute the heat loss from the building and then by means of formula (1) calculate the maximum amount of coal per hour that the stoker should be able to burn if continuously operated in order to balance the heat loss from the building when the outside temperature corresponds to the design temperature usually assumed in that locality. The actual capacity of the stoker should then be about twice as great in order to compensate for its intermittent operation.

Capacity by Previous Coal Consumption

In view of the inaccuracy of any heat loss computation that is not based on definite knowledge of the construction of the building, especially with regard to its insulation, it will be found very useful to depend on an indirect method either as a check or as our main source of information. This method uses the actual average coal consumption per season under hand firing as the starting datum. If we know that the coal consumption per season has averaged 100 tons during the past years, and, in order to be conservative, assume that by stoker firing we shall save only 10%, then our yearly coal consumption after the stoker is installed will be 90 tons. Our quick rule calls for a stoker having a maximum capacity of 180 pounds per hour in a locality where the degree-days are about 7000.

We can now apply a first check to our figure by computing the heat losses from the building and then by substituting this value of (H) in equation (1) find a new value of the stoker's capacity (N). It may not be necessary to measure all the rooms, but in many cases it will be sufficiently accurate to measure the building as a whole, find its cubic contents, the area of exposed wall and roof, and the glass surface.

A Problem in Capacity

Let us suppose that we found a heat loss from the building (H) of 670,000 Btu per hour. We assume that the coal we are going to burn has a calorific value of 12,000 Btu per pound, and, finally, we will have to assume a specific overall efficiency (E) for the heating system after the stoker is installed. We can only arrive at the value of (E) through our experience, and we will be somewhat handicapped by the fact that very likely we will not be familiar with the working of this particular heating system. We shall, therefore, have to assume an average value at this stage of our investigation, and we assume it to be 65%. From equation (1) we then find, substituting these values:

N = 86 pounds per hour (for continuous operation). In a steam heated building of this size we can assume that a stoker can be allowed to work 8 out of 16 heating hours when the outside temperature is the lowest assumed for design purposes in our locality. If the heating system were gravity hot water, 10 out of 16 hours would be considered sufficient margin of safety. In our case, then, the actual maximum capacity of the stoker should be 172 pounds per hour, which checks very closely with the capacity found by means of the quick-figuring rule.

We may want, however, to check ourselves still further. We can do so by computing the annual fuel consumption that should result from a heat loss (H) of 670,000 Btu per hour, as calculated by

(*Continued on page* 190)

SEE THE DISPLAY OF

AUER REGISTERS

at the sixth

International Heating
& Ventilating Exposition

Cleveland, Ohio, January 22-26

Booth 47

THE AUER REGISTER CO., CLEVELAND, OHIO

Auer

First

SHOW SECTION

AMERICAN ARTISAN

January, 1940

CLEVELAND PLAYS HOST

to

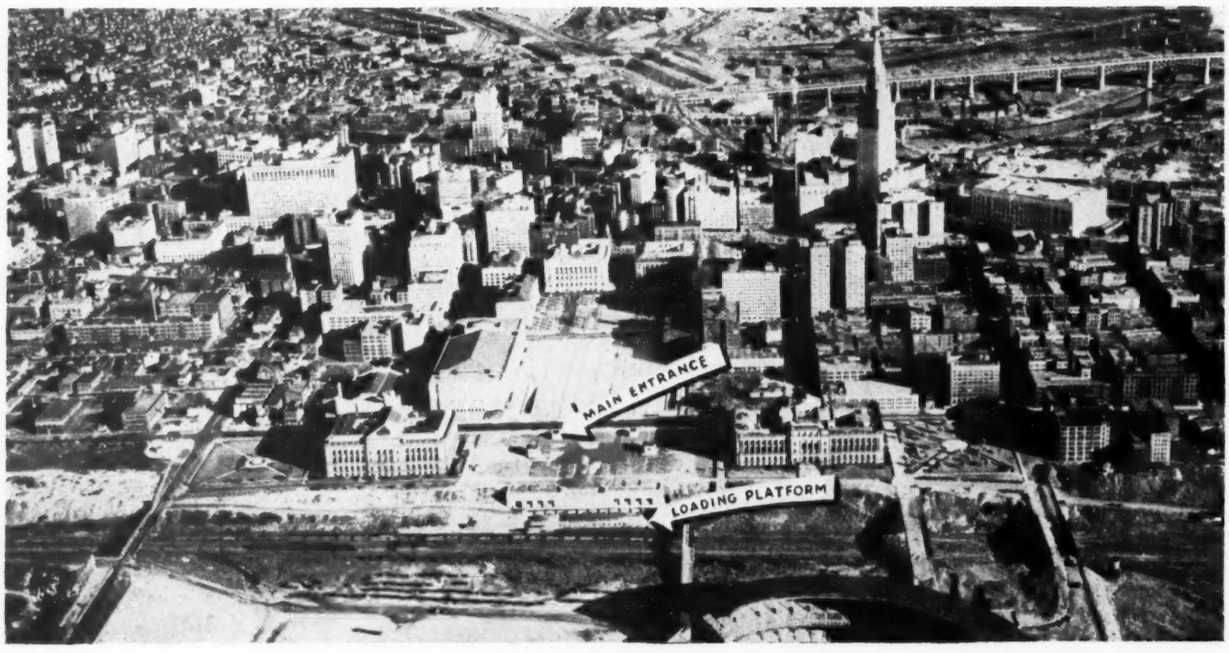
Sixth International Heating, Ventilating and Air Conditioning Exposition

44th Convention, National Warm Air Heating and Air Conditioning Association

First Convention, Sheet Metal, Roofing, Heating and Air Conditioning Contractors' National Association

46th Annual Meeting, American Society of Heating and Ventilating Engineers

January 22-26



Lakeside Hall—where the Sixth International Heating, Ventilating and Air Conditioning Exposition will be held

Industry Goes Into Big Week

A BIG week that should well repay the time spent in doing it in a big way is being staged in Cleveland, January 22-26. There the 6th International Heating, Ventilating and Air Conditioning Exposition will be held in Lakeside Hall, the 44th Convention of the National Warm Air Heating and Air Conditioning Association will be held at the Hollenden, the initial convention of the newly organized Sheet Metal, Roofing, Heating and Air Conditioning Contractors' National Association will be held at the Carter Hotel and the 46th Annual Meeting of the American Society of Heating and Ventilating Engineers will be held at the Statler. With such a line-up it is difficult to conceive of a better opportunity to absorb valuable information and to make worthwhile contacts.

The program of the National Warm Air Heating and Air Conditioning Association is presented in detail in this Section. Sessions have been planned to cover the subjects of vital importance to current and future practice and the man who would keep abreast of his field will make it a point to be at the Hollenden on Tuesday and Wednesday, the 23rd and 24th, when they are being presented. On Wednesday afternoon the N.W.A.H.A.C.A. will get together with the A.S.H.V.E. in joint session.

The program of the Sheet Metal, Roofing, Heating and Air Conditioning Contractors' National Association has not been so thoroughly formulated, but the evening of the 24th and the forenoon of the 25th will be devoted to committee meetings and in the afternoon of the 25th the convention proper will open. A code of regulations and by-laws will be submitted for adoption and discussions of the organizing activities and the need for such a national association will be on the list. Directors will be elected and after the close of the meeting the new directors will meet, elect officers and appoint committees.

The big "Show" opens at 2:00 p. m. on Monday, January 22, and runs daily thereafter through Friday, the 26th, from 12:00 noon to 10:30 p.m. More than 300 leading manufacturers have taken more space than at any previous exposition to present a wide variety of products for every kind of heating, ventilating and air conditioning application. The breadth and scope of the showings can be seen in the list of exhibitors in the following pages. A diagram of the exhibit hall, with booth numbers shown, is also presented so that the location of any exhibitor may be found.

In addition to the convention sessions and the "Show," the Cleveland Area Convention Committee has arranged for some very interesting inspection trips to nearby plants, among them the new continuous strip mill of Republic Steel Corporation, housed in buildings covering 21 acres.

Word comes from the Cleveland Area Convention Committee—Harold S. Sharp, general chairman; C. E. ("Jim") Wilcox, B. G. Krause, Frank Snowberg, A. L. Rybolt and C. A. Olsen, entertainment; S. D. Yardley, R. A. Jack and C. T. Burg, plant inspections; R. A. Jack, A. W. Lehman, Atlee Wise and A. G. Seymour, publicity; George S.

Auer, George Caleb, W. L. Seelbach and E. C. Fox, budget—that Cleveland hospitality will reign supreme during the week. Cash prizes are being provided by this committee for all convention sessions and the social highlight of the meeting will be a stag smoker and floor show in the Grand Ballroom of the Hollenden. Each person registering at the convention will receive a ticket to this affair free of charge. Members of the American Society of Heating and Ventilating Engineers are invited to this party as are the warm air heating registrants to the Monday and Wednesday night social functions of the A.S.H.V.E.

The ladies will find arrangements made for their entertainment during the afternoons and Tuesday night and, of course, will be very much a part of the Monday and Wednesday night parties.

THE WEEK AT A GLANCE

EVENTS: Sixth International Heating, Ventilating and Air Conditioning Exposition
44th Convention, National Warm Air Heating and Air Conditioning Association
46th Annual Meeting, American Society of Heating and Ventilating Engineers
First Convention, Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Nat'l. Assn.

PLACE: Cleveland, Ohio
Exposition—Lakeside Hall
NWAHACA—Hollenden Hotel
ASHVE—Hotel Statler
SMRHACCNA—Carter Hotel

TIME: Exposition—Opens 2:00 p. m., Monday, January 22, and 12 noon other days. Closes 10:30 p. m. each evening. January 22-26
NWAHACA—Technical and business sessions Tuesday and Wednesday, January 23 and 24. Joint session with ASHVE Wednesday, 2:00 p. m.
ASHVE — Registration, committee meetings Monday, January 22, 8:30 a. m.
Technical Sessions: Tuesday, Wednesday, Thursday, January 23, 24 and 25. Joint session ASHVE-NWAHACA Wednesday, 2:00 p. m.
SMRHACCNA—Convention opens afternoon, January 25.

PROGRAM

National Warm Air Heating and Air Conditioning Association—Hollenden Hotel

44th Convention

Tuesday morning, January 23

Chairman, L. R. Taylor.
A Welcome to Cleveland, Hon. Harold L. Burton, Mayor.
President's Message, L. R. Taylor.
Address, Charles M. White.
Don't Overlook the Gravity Furnace, by C. Ackerson.
The Three Bogeymen, by C. T. Burg.
The Publicity Campaign, by Allan P. Ames.

Tuesday afternoon, January 23 (Research Session)

Research Is a Stimulant to Management, Operation and Sales, by C. A. Olsen, Chairman.
Report of Research Advisory Committee, by F. G. Sedgwick, Chairman.
"Winter Air Conditioning-Forced Warm Air Heating," Heat Insulation, by A. P. Kratz.
Resistance of Air Flow to Registers and Grilles, by S. Konzo.

Tuesday evening, January 23

Smoker and Floor Show—Courtesy Northern Ohio manufacturers and jobbers (Grand Ballroom, Hotel Hollenden), Chairman, Jim Wilcox.

Wednesday morning, January 24

Chairman, H. P. Mueller.
Our Installation Codes, by B. F. McLouth, Chairman, Installation Codes Committee.
Sizing Registers for Forced Air and Air Conditioning Installations, by J. H. Van Alsburg.
Advertising and Merchandising Clinic, by F. E. Mehrings, Chairman, Merchandising Committee.
Our Over-All Merchandising Interest, by Jan S. Irvine.
Round Table Discussion.
Ninth Annual Short Course—Year Around Furnace Air Conditioning, by L. G. Miller.
Election of Officers.

Wednesday afternoon, January 24

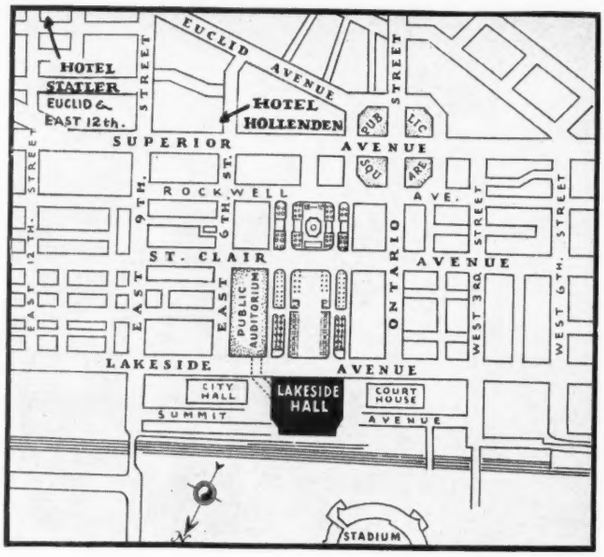
Joint Meeting with the American Society of Heating and Ventilating Engineers. Chairmen—J. F. McIntire, President, American Society of Heating and Ventilating Engineers, and L. R. Taylor, President, National Warm Air Heating and Air Conditioning Association.
The Research Activity of the American Society of Heating and Ventilating Engineers, by W. L. Fleisher.
The Research Activity of the National Warm Air Heating and Air Conditioning Association, by Frank L. Meyer.
The Bank of the Future, by Charles H. Mylander, Banker and Analyst.
Performance of a Stoker-Fired Warm Air Furnace as Affected by Burning Rate and Feed Rate, by A. P. Kratz and S. Konzo.

Thursday, January 25

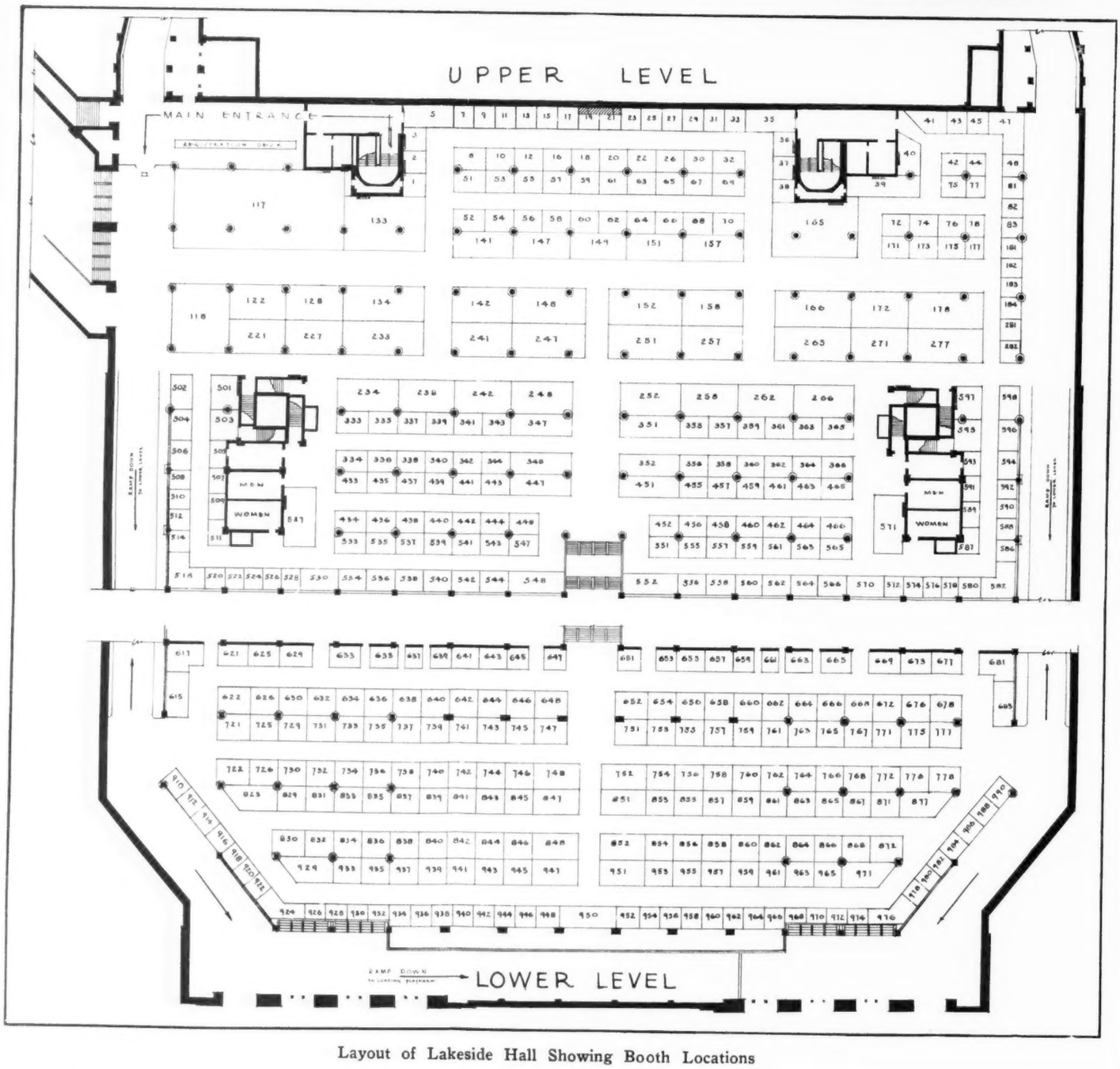
Inspection trip to the new strip mill of the Republic Steel Corp. housed in buildings covering 21 acres and located at the mouth of the Cuyahoga River.

Headquarters, ASHVE

Exhibit hall and hotel locations



Headquarters, NWAHACA



Layout of Lakeside Hall Showing Booth Locations

List of Exposition Exhibitors and Their Exhibits

The following pages give you in condensed form the essential information about exhibitors and exhibits that will appear at the Sixth International Heating and Ventilating Exposition. The listings below include, in alphabetical order, the names of exhibiting manufacturers and their booth numbers. The names of their representatives in attendance and a brief description of the products they will display are given for manufacturers particularly serving the warm air heating, residential air conditioning and sheet metal field. In addition, there is a diagram of the exhibit hall which will enable you to quickly locate the booth of any exhibitor. AMERICAN ARTISAN'S representatives will be at Booth 141 during the exposition, and will be glad to furnish visitors to the show with any additional information they may wish to have.

A busy and profitable week is in store for all who attend the show, according to information already available about the various exhibits. A considerable number of new products will be shown for the first time, and, in addition, a great many exhibits will show equipment in actual operation.

A

NAME OF EXHIBITOR	BOOTH NO.	REPRESENTATIVES IN ATTENDANCE	PRODUCTS ON EXHIBITION
Aerofin Corp., Syracuse, N. Y.	227–233	W. A. Evans, Geo. H. Cummins, M. Noble	Extended surface heating & cooling coils
Air Control Products, Inc., Muskegon, Mich.	598	Robert L. Leigh, H. G. McKee, E. G. Slater	Air conditioning registers and grilles; damper control sets; gravity registers
Air Controls, Inc., Cleveland, Ohio	341–343	B. G. Krause, R. B. Thompson, G. Schwarz, R. B. Dalton, A. Galaba	Filter units; blowers; blower parts; ventilators
Aire-O-Zone Corp., Chicago, Ill.	82		Direct-fired air conditioner
Air-Maze Corp., Cleveland, Ohio	535	F. M. Paul, G. M. Walton, H. H. Schaaf, P. C. Hungerford, C. J. Glanzer, C. Kozell, H. M. Flaherty, R. R. De Vere	Air filter panels for air conditioning and ventilating
Air Conditioning & Oil Heat, New York, N. Y.	548		
Airtemp Div., Chrysler Corp., Dayton, Ohio	41–42–43 44–45–47 48 and 75–77		Compressors; air conditioning units; direct-fired winter conditioners for oil or gas; oil burners
Aldrich Co., Peoria, Ill.	922–924	L. I. Aldrich, N. E. Aldrich, Frank Kupel, John Hassinger, Wm. B. McCarter	Numerous models of domestic oil burners
Allis-Chalmers Mfg. Co., Milwaukee, Wis.	642–644–646		Motors; pumps; V-belt drives
Aluminum Aircell Insulation Co., Detroit, Mich.	742	J. E. Hebberd	Building, duct, and furnace reflective insulation
American Air Filter Co., Inc., Louisville, Ky.	464–466	W. M. Reed, H. C. Murphy, J. R. McConnell, G. W. Sonntag, Jr., A. S. Lewis, Jr., F. K. Minor, A. F. Saunders, E. W. Shaver, Wm. Seelbach, J. D. Reed, I. B. Helburn, J. H. Milliken, O. C. Ross	New automatic self-cleaning electric precipitator; automatic, permanent, and throw-away air filters
American Artisan, Chicago, Ill.	141	See Keeney Publishing Co.	Publication
American Brass Co., Waterbury, Conn.	277		Copper tubes with wrought copper and cast bronze fittings for heating, refrigeration, and air conditioning lines; copper sheet; copper-silicon alloys for ducts and tanks
American Gas Association, New York, N. Y.	165		Exhibiting gas-fired equipment of: American Radiator Co., Ira E. Baker Co., Bastian Morley Co., Inc., Bryant Heater Co., Burnham Boiler Co., Cleveland Heater Co., Detroit Lubricator Co., Forest City Foundries Co., Gas Equipment Co., General Controls Co., Hotstream Heater Co., Lennox Furnace Co., L. J. Mueller Furnace Co., Reznor Mfg. Co., Servel, Inc., Surface Combustion Corp., Waterman-Waterbury Co., Westinghouse Elec. & Mfg. Co., White-Rodgers Elec. Co.
American Machine and Metals, Inc., DeBothezat Ventilating Equipment Div., East Moline, Ill.	53		
American Metal Hose Branch, American Brass Co., Waterbury, Conn.	277		
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.	117	V. L. Francisco, W. L. Tulburt, R. J. Milholland, H. A. Guthman, J. E. Lamping, H. P. Allen, A. L. Vanderhoff & Staff	Boilers; oil burners; radiators; water heaters; copper pipe and fittings; heating accessories; furnaces and air conditioners
American Rolling Mill Co., Middletown, Ohio	271	Tom Byrd, Nick Tiedeman, Ray Sloan, John Anderson	Paintgrip sheets; stainless steel sheets; zincgrip sheets; galvanized sheets
American Society of Heating and Ventilating Engineers, New York, N. Y.	503	Society staff	Society activities
American Steel & Wire Co., Cleveland, Ohio	438–440 and 537–539		See U. S. Steel Corp.
American Stove Co., Lorain Div., Lorain, Ohio	836		
American Viscostat Co., Chicago, Ill.	641		
Anchor Post Fence Co., Fluid Heat Div., Baltimore, Md.	929–933		See Fluid Heat Div., Anchor Post Fence Co.

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
Anderson Products Inc., Cambridge, Mass.	541		
Anderson Co., V. D., Cleveland, Ohio	56	W. J. Gleason, W. L. Norrington,	
Anemostat Corp. of America, New York, N. Y.	527		High velocity air diffuser; combination diffuser and lighting unit
Armstrong Machine Works, Three Rivers, Mich.	7		
Atlantic Valve & Pump Co., Chicago, Ill.	17		
Atlas Ball Co., Philadelphia, Pa.	730		
Auer Register Co., Cleveland, Ohio	647	George R. Metzger, George Auer.	Air conditioning and gravity registers and grilles
Auto-Heat Corp., New York, N. Y.	333–335	Otto B. Moody	Oil burners and boiler-burner units
Automatic Burner Corp., Chicago, Ill.	560–562	W. A. Doermann, Stanley Perry	Oil burners; air conditioners; boiler burner units; range burners
Automatic Gas Steam Radiator Co., Pittsburgh, Pa.	514		
Automatic Heat & Air Conditioning, Chicago, Ill.	59–61		
Automatic Products Co., Milwaukee, Wis.	437–439	R. W. Johnson, E. A. Vallee, A. A. Anderson, Donald Tmey, M. K. Jasperson, R. D. Marshall, Delmar Moerick	Refrigeration, heating and air conditioning controls
Autovent Fan & Blower Co., Chicago, Ill.	448	Tom Brown, C. E. Wandas, H. W. Kaiser	Propeller fans; volume blowers; unit heaters; V-belt drive unit blowers; kitchen cabinet ventilators; night air cooling fans
B			
Baker Ice Machine Co., Inc., Omaha, Nebr.	74	C. A. Baker, Charles Knox, V. E. Kauffman, August Huenecke, W. L. Ecabert, Roger Sprague, J. C. Vaught, Geo. Sebree, F. T. McDonough	One Freon condensing unit; two Freon compressors
Baldor Electric Co., St. Louis, Mo.	442		Electric motors
Barber-Colman Co., Rockford, Ill.	171–173	R. P. Dewey, C. J. Braatz, E. S. Huffman, V. M. Lathers, T. K. Greenlee, N. E. Smith, L. E. Slawson	Electric temperature controls; grilles and high velocity air diffusers
Barber Gas Burner Co., Cleveland, Ohio	654	H. M. Mansfield, Wm. J. Dueblin, Chas. Stine, E. W. Wolf, F. Brennen, D. Manuel, Chas. Holt.	Gas burners; gas pressure regulators; gas valves; automatic control
Barnes & Jones, Inc., Jamaica Plain, Boston, Mass.	334		
Beaver Pipe Tools, Inc., Warren, Ohio	352	E. R. Barkley, J. A. Thornton,	
Beckett Engineering Co., R. W., Elyria, Ohio	725	R. W. Beckett, Stanton Fitzgerald	Oil burner; new boiler unit
Bell & Gossett Co., Chicago, Ill.	64–66		
Bethlehem Foundry & Machine Co., Bethlehem, Pa.	951	C. S. Dieter, J. H. Van Sciver, J. B. White, J. Toner	Boiler-burner units and conversion oil burners
Bethlehem Steel Co., Bethlehem, Pa.	434–436	A. A. Warg, F. W. Milburn, C. B. Momberger, J. A. Erze, Beauvis Duffy	Sheets, shapes and pipe
Bishop & Babcock Mfg. Co., Cleveland, Ohio	744	Walter Root, Larry Zarbock, Ray Ramsey, Don Stroud, Joseph Brainard, Melvin Metzger	Ventilating fans; heating specialties; air conditioning blowers
Black & Decker Mfg. Co., Towson, Md.	640	Wm. J. Fenwick, L. B. Fitzgerald, J. F. Apsey, Jr., Wm. G. Williams	Electric tools
Boston Draft Control Co., Boston, Mass.	63–65		
Breuer Electric Mfg. Co., Chicago, Ill.	509	R. G. Breuer, R. R. Janke	Portable furnace and boiler vacuum cleaners
Brown Instrument Co., Philadelphia, Pa.	552-556-558		See Minneapolis-Honeywell Regulator Co.
Bryant Heater Co., Cleveland, Ohio	147-149-151	Lyle C. Harvey, Gordon Rieley, W. Randolph Lacey, J. N. Crawford, W. E. Stark, F. R. Higley, E. R. Downe, J. E. Kinner, C. H. Cummings, J. M. Fisher	Gas-fired heating and air conditioning equipment, including boilers, gravity furnaces, forced air furnaces, vertical furnaces, unit heaters, dehumidifiers
Buffalo Forge Co., Buffalo, N. Y.	241	F. W. Swan, C. C. Cheyney, T. A. Weager, R. E. Sherman, C. A. Booth, W. R. Heath, A. A. Criqui, E. F. Wendt, F. B. Stubinger	Ventilating fans; water spray cooling cabinet; new unit heater; suspended evaporative condenser; noise meter
Burdett Mfg. Co., Chicago, Ill.	621	F. W. Grantham, D. A. Jacobson, E. H. Perkins, T. P. Tesmer, J. E. Veihl	
Burnham Boiler Corp., Irvington, N. Y.	122		Boilers; radiators; specialties
C			
Canton Stoker Corp., Canton Ohio	630		Stokers
Carbondale Div., Worthington Pump & Machinery Corp., Harrison, N. J.	543–547		See Worthington Pump & Machinery Corp.
Carey Co., Philip, Lockland, Cincinnati, Ohio	657	H. A. Fox and others	Asbestos prefabricated air duct; pipe covering; rockwool insulation
Carnegie-Illinois Steel Corp., Pittsburgh, Pa.	438–440 and 537–539		See U. S. Steel Corp.
Carrier Corp., Syracuse, N. Y.	227–233	L. G. Powers, Margaret Ingels	Refrigeration compressors; unit air conditioners; unit heaters; outlets; cold diffusers; evaporative condensers
Carter Coal Co., New York, N. Y.	947		
Celotex Corp., Chicago, Ill.	534	I. L. Birner, W. J. McCauley, C. J. O'Grady	Insulation
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.	755	L. J. Sebek, J. A. Franklin	Pulleys; flexible couplings; shaft collars; die castings
Century Electric Co., St. Louis, Mo.	748		Complete line of motors for heating, air conditioning and refrigeration

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
Century Engineering Corp., Cedar Rapids, Ia.	148	Jos. A. Lattner, M. D. McWilliams, E. E. Scott, George K. Kelley, S. P. Densmore, C. E. McGregor	Conversion oil burners; boiler-burner units; furnace-burner units; domestic water units
Chace Co., W. M., Detroit, Mich.	637	S. R. Hood, C. F. Alban, C. W. Bloch.	Thermostatic bimetals
Char-Gale Mfg. Co., Minneapolis, Minn.	738	A. A. Horwitz	Prefabricated air conditioning ducts and fittings; registers; furnace fittings and supplies
Chase Brass & Copper Co., Inc., Waterbury, Conn.	659	W. M. Mulholland, A. F. Sheldon, J. S. Coe, A. E. Dillingham, V. H. Eggert	Spiral-fin tube; copper tube and sweat fittings; headers; screw machine parts; stampings; forgings
Chicago Filter Co., Joliet, Ill.	15	L. D. McGrew. Art Meiche, A. H. DeWees	Air filters for homes, automobiles, railway cars
Chicago Pump Co., Chicago, Ill.	265		
Chrysler Corp., Airtemp Div., Dayton, Ohio	See Airtemp Div., Chrysler Corp.		
Cleveland Steel Products Corp., Toridheet Div., Cleveland, Ohio	839–841–843.	George Rakovan, D. W. Rouse, L. F. Frett, J. F. Donnelly, J. A. Lappin, R. J. Long, O. C. Parker, J. L. O'Brien, W. J. Smith	Oil burners; boiler-burner units; air conditioning furnaces; gravity furnaces; water heaters
Cole-Sullivan Engrg. Co., Minneapolis, Minn.	281	A. D. Cole, H. J. Sewell, E. W. Laudert, I. E. Loring	Draft governors; draft stabilizers
Columbia Steel Co., San Francisco, Cal.	438–440 and 537–539		See U. S. Steel Corp.
Comfort Products Corp., Harvey, Ill.	83	B. J. Spitzka, J. F. Coyle, T. P. Gloppen	Portable room conditioner; air washing, filtering, circulating, and humidifying equipment; direct-drive variable speed blowers
Commercial Filters Corp., Boston, Mass.	528		
Commercial Investment Trust, Inc., New York, N. Y.	984–986		
Conco Corp., Mendota, Ill.	938–940	R. W. Conkey, W. G. Van Etten, W. S. Michael, M. J. Murray, H. W. Winningham, L. H. Klinger, H. F. Dean, W. W. Hallinan	Stokers; oil burners; winter conditioners
Cook Electric Co., Chicago, Ill.	939	E. H. Ziebold, K. C. Gillette, A. M. Wilkins	Controls for heating and air conditioning systems; metal bellows
Crane Co., Chicago, Ill.	252–258		Boilers and radiators; oil burning warm air conditioner; oil burner; boiler-burner unit; stoker-boiler unit; winter air conditioning unit; prefabricated duct system
Crowe Name Plate & Mfg. Co., Chicago, Ill.	512		Decorative metal parts; clock & instrument dials; nameplates
Curtis Refrigerating Machine Co., St. Louis, Mo.	747	H. C. Morrison, H. J. Nettler, A. L. Baker, E. Gygax, E. S. Lape, H. J. Campbell	Refrigerating and air conditioning equipment

D

Dayton Rubber Mfg. Co., Dayton, Ohio	564–566	T. C. English, T. C. Davis, J. D. Hershey, Karl H. Glanton, R. L. Wetzel	Cog-belts; V-Belt drives; fractional hp. belts
DeBothezat Ventilating Equip. Div., American Machine & Metals, Inc., East Moline, Ill.	53	C. W. Anderson, A. R. Stephen, A. M. Harp, E. O. Martinson, R. W. Denman	Ventilating sets; bifurcators; fans; agitator; power roof ventilator
Detroit Lubricator Co., Detroit, Mich.	570	P. S. Russel, A. G. Hann, E. J. Doucet, F. D. Cooper, H. L. Walker, J. S. Snyder, F. G. Coggin, W. H. Krack, F. A. Koch, A. A. Putt	Automatic, mechanical, and electrical controls and equipment for heating, cooling, and air conditioning
Dole Valve Co., Chicago, Ill.	633		
Domestic Engine & Pump Co., Shippensburgh, Pa.	635		
Domestic Engineering, Chicago, Ill.	59–61		
Dongan Electric Mfg. Co., Detroit, Mich.	837	L. J. Hicks, G. J. Scherling, H. H. Littlebury, C. G. Odell, L. P. Murphy	Ignition transformers
Dowagiac Steel Furnace Co., Dowagiac, Mich.	356–358	R. S. McNaney, Arthur Wick, A. F. Frazee, Graham Woodhouse, John Cunningham, Lou Silverthorn, Laurel Brown, John Walz, Harry Hartung, Carleton Behrmann	Steel furnace; oil-fired and gas-fired winter air conditioners; stoker-fired furnace; blower conditioning unit
Doyle Vacuum Cleaner Co., Grand Rapids, Mich.	21	Dewey I. Doyle, Geo. D. Crow	Furnace and boiler vacuum cleaners
Dunham Co., C. A., Chicago, Ill.	251		
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.	463–465		Winter air conditioning units; automatic oil furnace

E

Eagle-Picher Sales Co., Cincinnati, O.	1–2	John Tilden, J. H. Eisaman, Harold Powell, F. J. Bell, N. A. Blair, T. C. Carter, E. L. Gouedy, Douglas Via, J. L. Ash, Glen J. Christner	Insulation
East Ohio Gas Co., Cleveland, Ohio	165		
Electrol, Inc., Clifton, N. J.	944–946–948		Conversion oil burners; boiler-burner units; direct-fired units; split system conditioners; room coolers
Emerson Electric Mfg. Co., St. Louis, Mo.	533	R. E. Otto, O. D. Metz, Wm. Fraser, V. Maurer, R. Dehlendorf, T. Egan, G. Reindel, Jr.	Motors up to 5 hp.; attic, kitchen, and exhaust fans
Evans Products Co., Detroit, Mich.	733–735		Winter air conditioners
Excelsior Steel Furnace Co., Chicago, Ill.	914	C. E. Glessner, F. E. Ford, C. A. Gustavson, W. R. Lawson, R. H. Bristol, J. W. Westwick, John Fehlig, Jr., W. F. Menk	Oil burning air conditioner; forced air ducts and fittings

F

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
Fafnir Bearing Co., New Britain, Conn.	753	R. F. Steeneck, S. M. Cooper, A. L. Maltman, F. Leister, T. H. Schebrat, R. W. Powell	Ball bearings
Fairbanks, Morse & Co., Chicago, Ill.	559–561	J. W. Bostwick, W. S. Adams, H. E. Baker, C. H. Turner	Three and five ton self-contained units; remote units; ten ton compressor
Field Mfg. Co., Chicago, Ill.	63–65		
Fitzgibbons Boiler Co., Inc., New York, N. Y.	142	Paul K. Addams, and others	Boiler-burner units; direct-fired conditioners
Fluid Heat Div., Anchor Post Fence Co., Baltimore, Md.	929–933		Oil burners, water heaters; winter conditioning furnaces, boiler-burner units
Forest City Foundries Co., Cleveland, O.	23–25	W. L. Seelbach, I. E. Seith, J. Grouse, A. Bastian, L. Koch, W. Sullivan, W. Kremser, R. Strangward	Coal-fired and gas-fired gravity and air conditioning furnaces
Freeman Stoker Div., Ill. Iron & Bolt Co., Chicago, Ill.	10	J. M. McClintock, J. G. Beard, F. W. Cochrane, G. B. Riddle	Stokers
Frick Co., Inc., Waynesboro, Pa.	751		Five-ton unit air conditioner; Freon compressors
Friez & Sons, Julien P., Div. of Bendix Aviation Corp., Baltimore, Md.	536–538	Denis McCormack, George F. Knowles, John R. Onderdonk, Elliott Fansler	Instruments and controls for automatic heating, refrigeration and air conditioning
Fulton Syphon Co., Knoxville, Tenn.	363–365		
Furblo Co., Hermansville, Mich.	638	G. A. Voorhees, L. W. Gillespie, C. H. Lighthart, N. E. Hill, F. G. Herman	Air circulating blowers

G

General Controls Co., Glendale, Cal.	5	H. G. Wasserlien, E. T. Howard, J. Hammond, A. F. Read, W. G. Griggs, C. C. Tischler	Automatic temperature controls
General Electric Co., Schenectady, N. Y.	157		Motors and controls
General Electric Co., Air Cond. Dept., Bloomfield, N. J.	158 and 257		Air conditioning and heating equipment
General Furnaces Corp., New York, N. Y.	942	Harper Holt, A. P. Saha, William Palm	Oil-fired boiler-burner unit; instantaneous water heater
General Refrigeration Corp., Beloit, Wis.	636		Refrigeration and air conditioning equipment
General Regulator Corp., Chicago, Ill.	27	F. S. Matheny	Domestic, commercial, and industrial ventilating equipment
Gilbert & Barker Mfg. Co., Springfield, Mass.	68–70	H. F. Tapp, C. B. Cooley, W. N. Heseltine, J. A. MacDonell, D. B. Lawrence	Domestic and industrial oil burners; warm air conditioning unit; oil-fired boiler unit; hot water heater
Globe Machine & Stamping Co., Cleveland, Ohio	181	John Remesch, L. H. Seaman, R. T. Williams, A. J. Freiheit, R. E. Wilcox	Grilles; stampings; tumbling barrels; circulating heaters; mouldings
Grinnell Co., Inc., Providence, R. I.	242		

H

Harris & Co., Arthur, Chicago, Ill.	639	George C. Harris	Floats
Hart & Cooley Mfg. Co., Holland, Mich.	530	R. W. Blanchard, J. H. Van Alsburg, L. E. Heasley, G. Heeringa	Double deflection registers with turning-blade valves; gravity registers
Heating, Piping and Air Conditioning, Chicago, Ill.	141	See Keeney Publishing Co.	Publication
Heating & Ventilating, New York, N. Y.	910–912		
Heat Reclaiming Devices, Inc., Niles Center, Ill.	928		
Heil Co., Milwaukee, Wis.	455–457–459	Joseph F. Heil, C. B. Tamm, George Hochstein, Lee Hanson, Sam Tuttas, H. F. Pugh, Herman Frentzel, C. R. Buller	Oil-fired and gas-fired air conditioning units; boiler burner unit; oil burners
Henry Furnace and Foundry Co., Cleveland, Ohio	656–658	H. F. Curtis, J. L. Rushton, Ross Sharp, E. N. Moncrief	Coal, oil and gas, heating and air conditioning equipment.
Hilo Varnish Corp., Brooklyn, N. Y.	72	K. C. Tucker, C. J. Schumann, G. F. English, A. S. Ledbetter	Industrial finishes
Hoffman Specialty Co., Inc., Waterbury, Conn.	128		
Hotstream Heater Co., Cleveland, Ohio	441–443	O. A. Reiter, G. G. Gebhart, L. R. Mendelson	Draft regulators; water heaters; new indirect heater; new combustion test kit

I

Ilg Electric Ventilating Co., Chicago, Ill.	338–340	C. G. McKinley, D. A. Ferguson, C. W. Dexter, J. M. Frank, P. D. Briggs	Fans; blowers; unit heaters; kitchen ventilators; ceiling type cooling and heating unit; dark room ventilator
Illinois Engineering Co., Chicago, Ill.	221		
Illinois Iron & Bolt Co., Freeman Stoker Div., Chicago, Ill.	10		See Freeman Stoker Div., Illinois Iron & Bolt Co.
Illinois Testing Laboratories, Inc., Chicago, Ill.	651	M. D. Pugh, E. F. Burke, J. A. Obermaier	New air velocity meter; resistance thermometers; pyrometers and accessories
Imperial Brass Mfg. Co., Chicago, Ill.	76		
Independent Pneumatic Tool Co., Chicago, Ill.	838		
Independent Register Co., Cleveland, Ohio.	451		Air conditioning registers and grilles
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.	757		Sheets; solar heat resisting screen.
Insto-Gas Corp., Detroit, Mich.	858		
Iron Fireman Mfg. Co., Cleveland, Ohio	952–954–956–958	C. T. Barg, Dale Wylie W. F. Gleeson, E. C. Webb, K. E. Saboe	Stokers

J

Janette Mfg. Co., Chicago, Ill.	625		Blower wheels; D.C. to A.C. rotary converters; motorized speed reducers

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
Jefferson Electric Co., Bellwood, Ill.	745	C. T. Harnett, F. H. Pickerill	Oil burner ignition transformers; mercury switches and controls
Jenkins Bros., New York, N. Y.	118		
Johns-Manville, New York, N. Y.	342–344		Insulation
Johnson Co., S. T., Oakland, Cal.	950	Robert P. Johnston, M. Ratcliff, Nathan Feldman, J. C. Johnson, H. W. Leeper, Gardner Murray	Oil burners; air conditioning units; indirect split systems; furnaces; water heaters; boiler-burner units
Johnson Service Co., Milwaukee, Wis.	571		
K			
Kaustine Co., Inc., Perry, N. Y.	12 and 16	J. B. Mollnow, L. L. Peeke, W. A. Seitz	Air conditioning furnaces
Keeney Publishing Co., Chicago, Ill.	141	F. P. Keeney, W. J. Osborn, R. P. Wettstein, C. E. Price, R. A. Jack, C. M. Burnam, Jr., J. D. Wilder, J. D. Thomas	Books and publications
Kehm Corp., Chicago, Ill.	721		
Kent Co., Inc., Rome, N. Y.	9		Furnace vacuum cleaners
Kewanee Boiler Corp., Kewanee, Ill.	117		
Kleen-Heet, Inc., Chicago, Ill.	560–562	David Laine, J. W. Hirsch	Oil burners; air conditioners; boiler burner units
Koppers Coal Co., Cleveland, Ohio	960–962	V. L. Ott, J. J. Sidebotham	Processed pocahontas stoker coal
L			
Lamneck Products, Inc., Columbus, Ohio	551–555–557	Ralph E. Leffler, Edward H. Paul	Prefabricated duct and fittings for residential air conditioning; furnace pipe and fittings
Lau Blower Co., Dayton, Ohio	847	E. B. Lau, R. A. Mayne, E. C. Wolford, F. A. Lautz, E. H. Berge, O. C. Sommers, H. M. Sawrie, L. W. Swigert	Package blowers; blower assemblies; blower wheels; pulleys; pillow blocks; attic fans
M			
Macrae, Inc., Brooklyn, N. Y.	643		Oil burners; boiler-burner unit
Magnet Switch Co., Chicago, Ill.	526	T. C. Russell, Tom Russell, Jr.	Room thermostats; draft controls
Maid-O'-Mist, Inc., Chicago, Ill.	524	Wm. J. Woolley, O. V. Woolley	Humidifiers; water line control valves; boiler water feeder and cut-outs; water softeners; air eliminators
Marsh Corp., Jas P., Chicago, Ill.	69		
Maurey Mfg. Corp., Chicago, Ill.	572	S. R. Noble, Joseph Maurey, Carl A. Miller, Warren Baldwin, H. N. Davis	Steel and cast iron "V" pulleys; fans
May Oil Burner Corp., Baltimore, Md.	30–32	Edward P. Hayes, Charles R. Collins, J. Geartner, Joseph C. Hauf, Jr., Gene Hauf, J. O. Miller, C. M. Viley	Oil burners and oil burning furnaces and conditioners
McAlear Mfg. Co., Chicago, Ill.	635		
McCord Radiator & Mfg. Co., Detroit, Mich.	739	W. G. Hancock, R. H. McGeorge, F. Longyear, J. R. Hayward, D. J. Mull	Steam, hot water, and gas unit heaters; blast heating and cooling coils
McDonnell & Miller, Chicago, Ill.	182–183	E. N. McDonnell, Bruce P. Adams, Jack McDonnell, Al Porter	Boiler water feeders; low water cut-offs; humidifier water controls
Mercoid Corp., Chicago, Ill.	563–565	Hugh Courteol, I. E. McCabe, J. W. Owens, R. F. Fisher, A. N. Schultz, W. K. Stauffer, W. L. Colterjohn, A. S. Widowfield, W. Ufer, Myron Wimmer, Cliff Grube, John Jex, Jr., Burt Power, B. L. Lerch, W. Lischett	Automatic controls for oil burners, stokers, air conditioning and refrigeration equipment, and various industrial applications
Meriam Co., Cleveland, Ohio	661	J. B. Meriam, A. A. Hejduk, Charles Meriam, H. R. Bowers, J. B. Meriam, Jr.	Manometers; flow meters; pressure gauges; draft gauges
Metal Stamping & Mfg. Co., Cleveland, Ohio	737	Thompson Morrison, Hunter Morrison, Jr.	Blowers
Meyer & Bro. Co., F., Peoria, Ill.	36	Geo. Harms, Ervin Eichenberger, Art Kinsner, R. B. Dickson, J. F. Klein	Furnace pipe and fittings; forced air ducts; registers; fans; blowers
Meyer Furnace Co., Peoria, Ill.	37–38	See F. Meyer & Bro. Co.	Gravity and forced air furnaces
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.	552–556–558	H. E. Chapler, W. J. Brown, C. C. Cochran, A. C. Grant, C. D. Lyford, L. H. Johnson, E. K. Scoggin, F. E. Walbridge, F. E. Snowberg, C. W. Nessell, J. E. Robb, A. E. Petersen, H. Seelbach, D. J. Peterson, J. C. Dorsey, A. B. Newton, J. E. Haines, R. H. Sweeney, R. A. Wilson, W. L. McGrath, Mel Hamilton, F. Purcell, C. B. Sweatt, W. L. Huff, Tom McDonald, J. W. Pauling, A. H. Lockrae, H. F. Dever, W. J. McGoldrick, A. E. Michelson, Chandler Murphy	Temperature, humidity, and refrigeration controls
Modine Mfg. Co., Racine, Wis.	752	A. G. Dixon, O. E. Desmond, G. A. Rock, A. F. McGovern, M. J. Druse	Unit heaters; copper convectors; cooling coils; blast heaters; air conditioners
Monarch Mfg. Works, Inc., Philadelphia, Pa.	282	J. M. Carroll, E. B. Frame, T. W. Murphy	Oil and water atomizing nozzles; fuel units and pumps; flexible couplings; regulating valves and strainers
Monmouth Products Co., Cleveland, Ohio	3	Mr. Barnes, O. J. Kuenhold, and others	Humidifying equipment
Motor Wheel Corp., Duo-Therm Div., Lansing, Mich.	463–465		See Duo-Therm Div., Motor Wheel Corp.
Mueller Brass Co., Streamline Pipe & Fittings Div., Port Huron, Mich.	364–366		See Streamline Pipe & Fittings Div.

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
Mueller Furnace Co., L. J., Milwaukee, Wis.	134	H. P. Mueller, C. L. Hewitt, Jr., N. M. Blanchard, R. M. Rosebrough, D. E. Cummings, J. G. Werner, M. L. LaVorgna, W. H. McKaig, R. A. Warner, H. B. McKee, E. H. Saunders, K. T. Davis, G. E. McDonough	Coal, oil, and gas-fired winter air conditioning units
Murray Corp. of America, Detroit, Mich.	918–920	H. C. Beresford, W. H. Kuhn, L. E. Walsh	New electric stoker
N			
Nash Engineering Co., South Norwalk, Conn.	248 and 347		
National Machine Works, Chicago, Ill.	67	Barney Olson	Power gas conversion burners
Nesbitt, Inc., John J., Holmesburg, Philadelphin, Pa.	501	A. J. Nesbitt, H. Berkley Hedges, H. C. Porter, John M. McElgin, D. C. Wiley	Heating surface; water cooling coils
Niagara Blower Co., New York, N. Y.	175–177		
Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.	433		Air conditioning and automatic heating products
O			
Ohio Foundry & Mfg. Co., Steubenville, Ohio	953	W. L. Sharpe, G. H. McFadden, W. G. Overmyer, C. J. Grayson	Gas room heaters; forced air gas circulators; floor furnaces; bath room wall heaters
Oilheating & Airconditioning Fueloil Journal, New York, N. Y.	853–855		
Olson, Inc., Barney, Chicago, Ill.	67		See National Machine Works
Oster Mfg. Co., Cleveland, Ohio	634		
Owens-Corning Fiberglas Corp., Toledo, Ohio	846–848	Jan S. Irvine, C. L. Rowley, W. H. Atkinson, J. C. Solon	Air filters; insulation
P			
Pacific Gas Radiator Co., Huntington Park, Cal.	758–760		Gas-fired heating and air conditioning equipment
Pacific Lumber Co., Chicago, Ill.	81	John H. Klass, Marvin L. Fergestad, Stanley H. Dickson, Nels P. Waite	Wool insulation
Patterson-Kelley Co., Inc., East Stroudsburg, Pa.	462		"Freon" water cooler
Peerless Electric Co., Warren, Ohio	461	I. F. Delehanty, W. S. Kingsbury, Wm. Moore, R. W. Swift, R. W. Best	Blowers; fans; motors; fan blades; blower wheels; package units; cabinets
Peerless Mfg. Corp., Louisville, Ky.	662		Stokers
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.	968–970	E. C. Stauffer, J. B. Stauffer, H. C. Altenburg, S. J. Cipoletti	Burner boiler unit; winter air conditioner units; domestic water heater; oil burners
Penn Electric Switch Co., Goshen, Ind.	55–57		Controls for heating, air conditioning, and refrigeration
Perfection Stove Co., Cleveland, Ohio	133	C. H. Foulds, G. B. Ober, W. R. Wright, J. H. Hosier, L. E. Cady, E. B. Goodwin, R. A. Walls, A. J. Horn	Oil-burning and gas-burning air conditioning furnaces
Perfex Corp., Milwaukee, Wis.	52–54	J. K. Luthe, F. D. Hansen, B. L. Boalt, H. E. Lindemann, Shepard Barnes, R. H. Brady, Allen Butler, D. G. Spahr, L. B. Miller, R. H. Pratt, W. R. Miller.	Controls for automatic heating and air conditioning
Petroleum Heat & Power Co., Stamford, Conn.	518–520	C. E. Shields, A. E. Hess, G. T. Kaufman, J. F. Corrigan	Domestic and industrial oil burning equipment and accessories
Petrometer Corp., Long Island City, N. Y.	63–65		
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.	511		Drying equipment
Plumbing & Heating Journal, New York, N. Y.	586		
Plumbing & Heating News, Chicago, Ill.	59–61		
Pocahontas Fuel Co., Inc., Cleveland, Ohio	930–932–934–936	J. Hadley, G. Weigle, J. A. Davidson, W. L. Higgins, F. Snyder, R. Erickson	Automatic bin-feed, ash-removal stoker for bituminous coal; winter air conditioning units
Power Plant Supply Co., Cleveland, Ohio	635		
Progressive Co., Chicago, Ill.	982		
Propellair, Inc., Springfield, Ohio	845	J. B. Shaver, V. W. Sharpe	Propeller fans for general ventilation and duct systems
Pyrolite Products Co., Cleveland, Ohio	19	N. B. Radabaugh, H. G. Gaberdiel, C. Schrank	Refractories; furnace cement; heat-resisting paint
Q			
Quaker Mfg. Co., Chicago, Ill.	22 and 26	A. T. Atwill, D. J. Howard, H. G. Hays, Sam Johnson, Frank Hohler, W. J. Walkoe	Oil burning furnaces; conversion burners
Quiet-Heet Mfg. Co., Newark, N. J.	935	S. L. La Pidus, R. La Pidus, M. Kish	Oil burners
R			
Randall Graphite Products Corp., Chicago, Ill.	447	W. P. Thacher, R. H. Whiteley, M. E. Clark, H. C. Whiteley, G. G. Terris, R. L. Whiteley, C. E. Lowgren, E. A. Lampe	Pillow blocks; graphite bronze bushings; safety collars
Reif-Rexoil, Inc., Buffalo, N. Y.	359–361	Allan F. Reif, Chas. A. Reif, Clarence Beals, Lawrence Knapp	Oil burners; boiler burner units; furnace burner units; winter air conditioners; refractory combustion chambers
Republic Steel Corp., Cleveland, Ohio	166	J. C. Burley, S. D. Yardley, R. W. Baker, F. H. Ramage, R. P. Newall, H. P. Rankin, C. S. French, F. J. Schreiber, A. H. Loranger, R. B. Kelly, M. I. Shea, W. E. Fruhen, R. E. Sonneborn, M. C. Lynch, H. W. Reinker, H. C. Richardson, J. J. Sohm, P. W. Ressler	Galvanized and black sheets; stainless steel; pig iron; pipe; bolts and nuts

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
Reynolds Mfg. Co., Grand Rapids, Mich.	754		
Richmond Radiator Co., Inc., Uniontown, Pa.	544	C. C. Adams, A. A. Marks, Paul Lawrence, Wm. Paul	Gas fired air conditioner; gas fired boiler; convector radiators; prefabricated air conduit
Ric-wiL Co., Cleveland, Ohio	629		
Ridge Tool Co., Elyria, Ohio	31–33		
Rome-Turney Radiator Co., Rome, N. Y.	632	W. L. Lynch, J. J. Boylan, E. L. A. Forster, E. J. Parry, W. J. Beasley, J. M. Shannon	Concealed copper radiation; unit heaters; blast air heaters and air cooling coils; refrigeration condensers; helical fin tubing
Roots-Connersville Blower Corp., Connersville, Ind.	635		
Ruberoid Co., New York, N. Y.	615	J. M. High, P. D. Wersant, Robert J. Baptist, Alfred Gerlach, Thomas Oliver	Pipe covering; insulating jackets for range boilers; insulating blocks for irregular surfaces; insulating cements; asbestos papers and millboard
Russell Co., F. C., Cleveland, Ohio	336		Combination screen and storm window; all metal venetian awning
S			
Sarco Co., Inc., New York, N. Y.	238		
Schaub Engineering Co., Fred H., Chicago, Ill.	972–974		
Scully Steel Products Co., Chicago, Ill.	438–440 and 537–539		See U. S. Steel Corp.
Servel, Inc., Electric Refrigeration & Air Conditioning Div., Evansville, Ind.	622	Harry Newcomb, E. A. Terhune, H. T. Kessler, W. J. Aulsebrook, C. L. Olin, P. B. Reed	Refrigerating machines and compressors for air conditioning
Sheet Metal Worker, New York, N. Y.	502		Publication
S K F Industries, Inc., Philadelphia, Pa.	730	R. H. DeMott, R. C. Byler, F. E. Ericson, R. R. Hirsch, P. R. Payson, C. B. Knowles	Ball and roller bearings and transmission appliances
Skilsaw, Inc., Chicago, Ill.	740	E. W. Ristau, F. M. Goodman, H. H. Thompson	Portable electric saws; drills; grinders; floor and disc sanders
Snips Magazine, Chicago, Ill.	184		Publication
Spang Chalfant, Inc., Pittsburgh, Pa.	756		
Spence Engineering Co., Inc., Walden, N. Y.	626		
Spencer Thermostat Co., Attleboro, Mass.	435	V. G. Vaughan, R. M. Glidden, N. A. Naylor	Room thermostats; limit controls; fan switches; duct thermostats; stoker timers; gas valves; pilot switches and valves; thermal time delay relays; motor protectors
Standard Lime & Stone Co., Baltimore, Md.	510	John H. Fahy, A. M. Norton, J. M. Daffron, E. E. Kresge	Rock wool home insulation materials
Stanley Electric Tool Co., New Britain, Conn.	677	L. H. Bellows, N. S. Bramer, A. J. Peterson, L. R. Warnock, H. W. Blackman	Motor driven shears; electric drills; electric grinders; diamond wheel dresser
Steel & Tubes Div., Republic Steel Corp., Cleveland, Ohio	337–339		
Stoker & Airconditioner Journal, New York, N. Y.	857		
Streamline Pipe and Fittings Div., Mueller Brass Co., Port Huron, Mich.	364–366	C. E. Berry, G. R. Allen, W. A. Blessed, F. L. Riggin, Jr., E. M. Fitzgerald, B. A. Devine, P. H. Berry, H. Scott	Copper pipe; solder type fittings; valves, fittings and accessories for refrigeration
Strong, Carlisle & Hammond Co., Cleveland, Ohio	663		
Sullivan Valve & Engineering Co., Butte, Mont.	504		
Sundstrand Machine Tool Co., Rockford, Ill.	645	C. H. Rystrom, B. F. Olson, H. H. Ekstrom, W. A. Kemp	Fuel pumps and fuel units for pressure atomizing oil burners
Surface Combustion Corp., Toledo, Ohio	247	C. B. Phillips, E. A. Weaver, N. B. Buehrer, H. C. Gurney, H. T. Gates, B. Ralph, J. A. Thomas, W. J. Grover, R. L. Towne	Gas-fired winter air conditioners and boilers; conversion burners; unit heaters
T			
Taco Heaters, Inc., New York, N. Y.	355–357		
Taylor-Winfield Corp., Warren, Ohio	746	John D. Gordon, W. A. Anderson, T. S. Long, E. A. Mallett, F. C. Terry, J. A. Abbott, J. E. Mallett, E. J. Gorde, J. H. Cooper, S. M. Humphrey, H. B. Axtell, E. J. Del Vecchio	Air operated and hydraulic portable welders; stationary spot welders
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.	438-440 and 537-539		See U. S. Steel Corp.
Thrush & Co., H. A., Peru, Ind.	8		
Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit, Mich.	852–854–856	Willard F. Rockwell, Walter F. Rockwell, T. A. Crawford, M. A. Powers, W. J. Chappell, J. C. Johnson, Ralph Hooke, H. M. Soyster	Oil-fired boiler unit; oil-fired winter air conditioner
Tinnerman Products, Inc., Cleveland, Ohio	734–736	A. H. Tinnerman, G. A. Tinnerman, Wm. M. Buttress, J. M. Stofer, Geo. A. Hansmann, T. O. Dahlstrand	Speed nuts; speed clips
Toledo Pipe Threading Machine Co., Toledo, Ohio	11–13		
Trane Co., La Crosse, Wis.	39–40	R. H. Anderegg, W. Goodman, C. L. Ringquist, E. W. Gray, R. V. Faulks, H. C. Rooks	Convectors; air conditioners; unit heaters; evaporative condensers; compressors; coils; water chiller; heating specialties
Triplex Heating Specialty Co., Inc., Peru, Ind.	522		
Tuthill Pump Co., Chicago, Ill.	648		Pumps for domestic and industrial oil burners
Tuttle & Bailey, Inc., New Britain, Conn.	653–655	Stanley Hart, J. H. Smart, T. S. Hart, G. F. Nightingale, F. W. Wills, E. P. Russell, J. W. Maier, F. C. Wetherbee	Grilles; registers; diffusers; air control devices

U

Name of Exhibitor	Booth No.	Representatives in Attendance	Products on Exhibition
United States Radiator Corp., Detroit, Mich.	234		Boilers; radiators; air conditioning units; heating accessories
United States Register Co., Battle Creek, Mich.	444	Charles J. Pearson, F. C. Bowers, A. A. Stagg, Harry G. Hollman, E. P. Kromdyk	Gravity registers and faces; air conditioning registers, vents and grilles, dampers
United States Steel Corp., Pittsburgh, Pa.	438-440 and 537-539		Galvanized, black iron, copper steel, and stainless steel sheets; tubular products

V

Viking Air Conditioning Corp., Cleveland, Ohio	652	M. I. Levy, A. Bennekamper, W. E. Van Horne, A. W. Lehman, Harry Boling, Frank P. Gibbons	Blower filter units; blower assemblies; blower wheels and housings; bearings; attic fans; humidifiers; water level control valves
Viking Mfg. Corp., Seville, Ohio	834		"Freon" compressors and self-contained units
Vinco Co., Inc.	660		

W

Wagner Electric Corp., St. Louis, Mo.	360-362		Motors for compressors, pumps, water circulators, fans, blowers, unit heaters, stokers; water-cooled motors
Walton Laboratories, Inc., Irvington, N. J.	35	Wm. Feldermann, E. F. Tinnerman, Jr., G. C. Kuffer	Humidifiers
Ward Co., Inc., Edgar T., River Forest, Ill.	617		
Waterloo Register Co., Waterloo, Iowa	505-507	John C. Knox, James F. Northey, Foster H. Benson	Registers; grilles; diffusers; ventilators; dampers
Waterman-Waterbury Co., Minneapolis, Minn.	172	H. G. Cross, A. R. Schwantes, F. G. Sedgwick, Geo. R. Melema, B. D. Watchler	Furnaces; oil-burning and gas-fired air conditioners; furnace blowers
Watts Regulator Co., Lawrence, Mass.	51		
Wayne Oil Burner Corp., Fort Wayne, Ind.	943-945		Oil burners
Weatherhead Co., Cleveland, Ohio	741-743	Norman Paquin, G. R. Whippo, O. C. Wilk	Silica-gel dryer; valves; fittings; receiver tanks
Webster & Co., Warren, Camden, N. J.	152		
Webster Electric Co., Racine, Wis.	851	E. M. Ford, S. A. Loeb, A. C. Kleckner, P. G. Crewe, H. C. Osborne, V. D. Ott, B. T. Wiechers, D. R. Parker, J. J. Lawler	Fuel units; ignition transformers
Weil-McLain Co., Chicago, Ill.	348		
Weinman Pump Mfg. Co., Columbus, Ohio	635		
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	452-456-458-460		Room conditioners; compressors; air conditioning units; gas boilers; oil furnaces; motors; controls; instruments; electric air cleaners; unit heaters; oil burners
White-Rodgers Electric Co., St. Louis, Mo.	540-542	L. F. Blough, Joseph Newman, Jack Searls, J. A. Rodgers, G. R. Gibson, E. E. Harwood, Don Piper, D. O. Eggert, E. E. Stoughton	Limit controls; thermostats; gas valves; stoker controls; damper regulators; fan controls
Whitney Metal Tool Co., Rockford, Ill.	683	Gus Jensen, Herbert Roos	Punches; shears; presses; brakes; angle iron machinery; Pittsburgh lock rolling machine
Whittington Pump & Engineering Co., Indianapolis, Ind.	681		
Will-Burt Co., Orrville, Ohio	978-980	H. E. Wyss, J. R. Luellen, E. G. Baer, R. W. McFadden	Stokers
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.	178		Oil burners; water heaters; air conditioning units
Wilson Co., H. A., Newark, N. J.	937	L. Brock, J. Strong, A. D. Keedwell	Thermostatic bimetals; electrical contacts
Wing Mfg. Co., L. J., New York, N. Y.	78		
Wood Industries, Inc., Gar. Air Conditioning Div., Detroit, Mich.	58-60-62	Frank H. Dewey	Direct-fired air conditioners; boiler-burner units; hot water heaters
Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.	543-547		Central air conditioners; condensing units; compressors; pumps

X

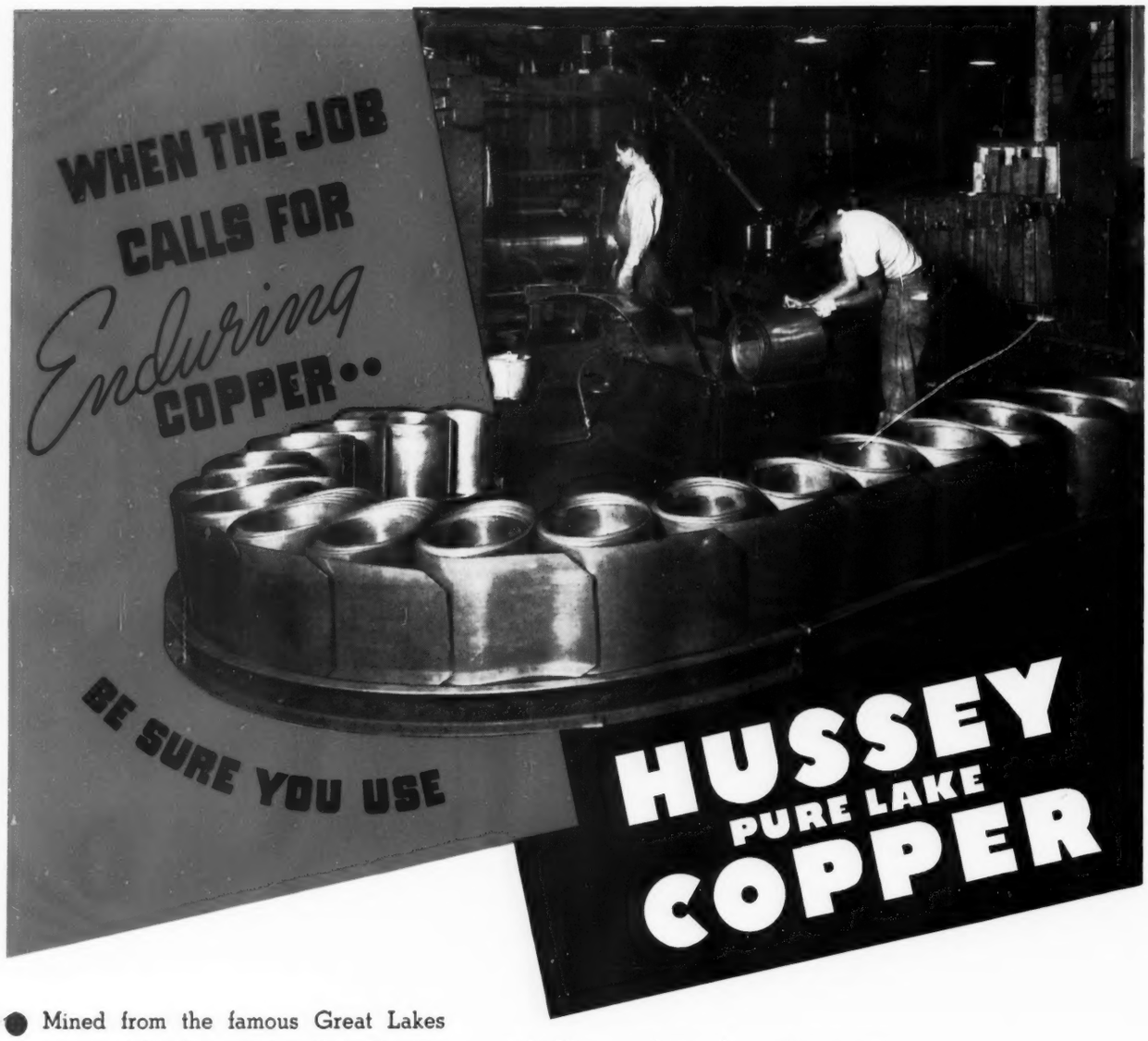
"X" Laboratories, Inc., New York, N. Y.	29		

Y

York Ice Machinery Corp., York, Pa.	262 and 266	S. E. Lauer, J. R. Hertzler, W. E. Barnum, J. L. Rosenmiller, H. S. Yoder, C. J. Schurman, J. A. Schurman	Sectionalized model of new "Freon-12" compressor; air conditioning units; evaporative condenser; condensing unit; oil and gas fired air conditioning furnaces
York Oil Burner Co., Inc., York, Pa.	840-842-844	A. J. Seiler, E. P. Ryan, G. E. Athana, A. L. Frank, E. I. Kraber, A. Ruff	Conversion burners; boiler units; forced warm air units
Young Radiator Co., Racine, Wis.	351	U. C. Finney, Wm. E. Teklenburg, W. J. Snow, R. D. Ashley, R. A. Mayne, R. H. Biggers, R. C. Coblentz, H. D. McClintock, W. H. Bateman, E. W. Meyer, M. F. May, W. H. Schleck, S. K. Andersen, F. M. Young	Convectors; unit heaters; heating and cooling coils; evaporators; air conditioning equipment
Young Regulator Co., Cleveland, Ohio	926	E. O. Young, Chas. E. Kain, Chas. E. Pidgeon	Damper regulators and dampers
Youngstown Sheet and Tube Co., Youngstown, Ohio	18-20	Walter E. Scott, John M. Tuthill, Geo. V. James, Myron S. Curtis, R. D. McKenzie, C. H. Longfield	Steel sheets

SHEET METAL SECTION

DEVOTED TO SHEET METAL CONTRACTING AND FABRICATING



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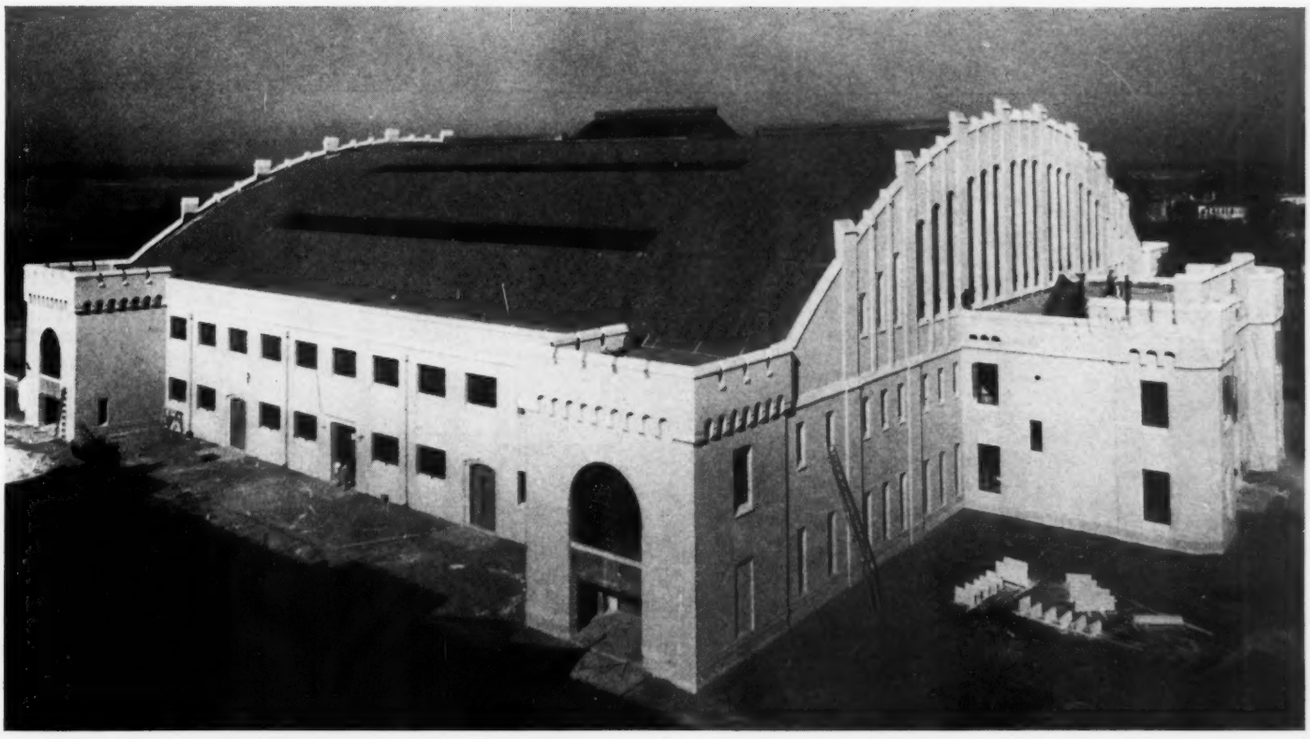
ROLLS ROD
TUBING
NAILS AND RIVETS
PREFABRICATED
ROOFING MATERIALS

Copper **HUSSEY** Brass



Large Copper Roof Has Unusual Provisions For Expansion and Contraction

The Citadel, Military College of South Carolina, founded in 1842 as a garrison and training school for young men, graduated its first class in 1846. Two hundred, of its 240 graduates, served as officers in the Confederate service. The first shot of the Civil War was fired by command of a Citadel graduate. From 1865 to 1881 the Citadel was in the hands of the U. S. military authorities. Reopened in 1882 and continuing without interruption since, the cadet corps now numbers 1,000. In the physical property improvement under way since 1918, the Armory is an outstanding structural achievement.

IN Charleston, South Carolina, there was completed recently a large copper roofing contract which incorporates in the copper application some interesting features particularly pertinent to large roof areas subject to heavy rains, strong winds, high temperatures. The building is the armory at the Citadel, the military college of the State of South Carolina and one of the widely recognized military establishments of the country.

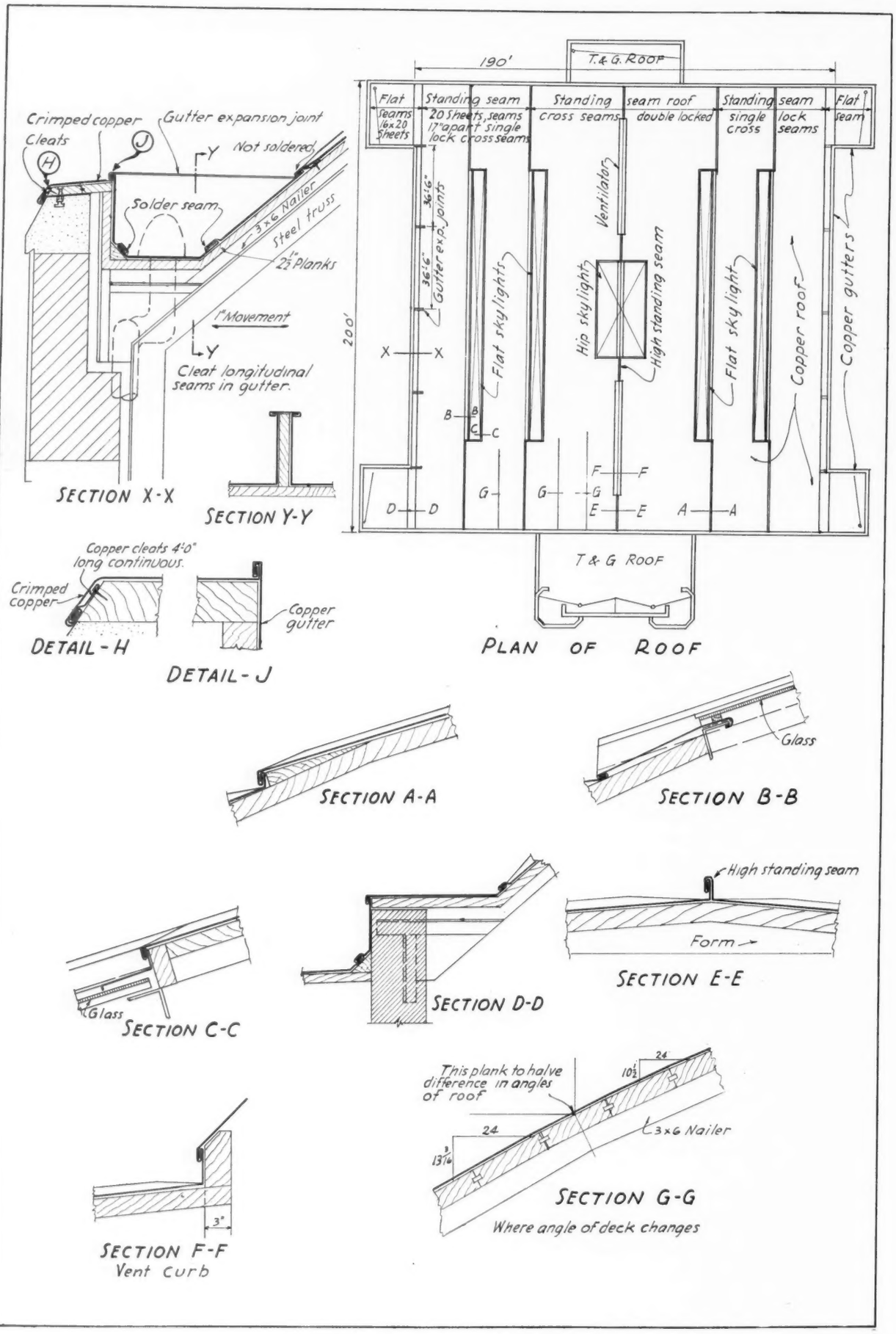
The armory is 200 feet long by 190 feet wide, inside, with bleachers on four sides and a clear floor space 200 by 150 feet. The roof construction consists of four, three-hinged structural steel arches, spaced 40 feet on centers which, together with the end walls, provide the 200 feet of length. The trusses form practically a curved roof with an approximate radius of 144 feet. The peak of the roof is about 65 feet above the floor; at the side walls the roof is about 32 feet above ground.

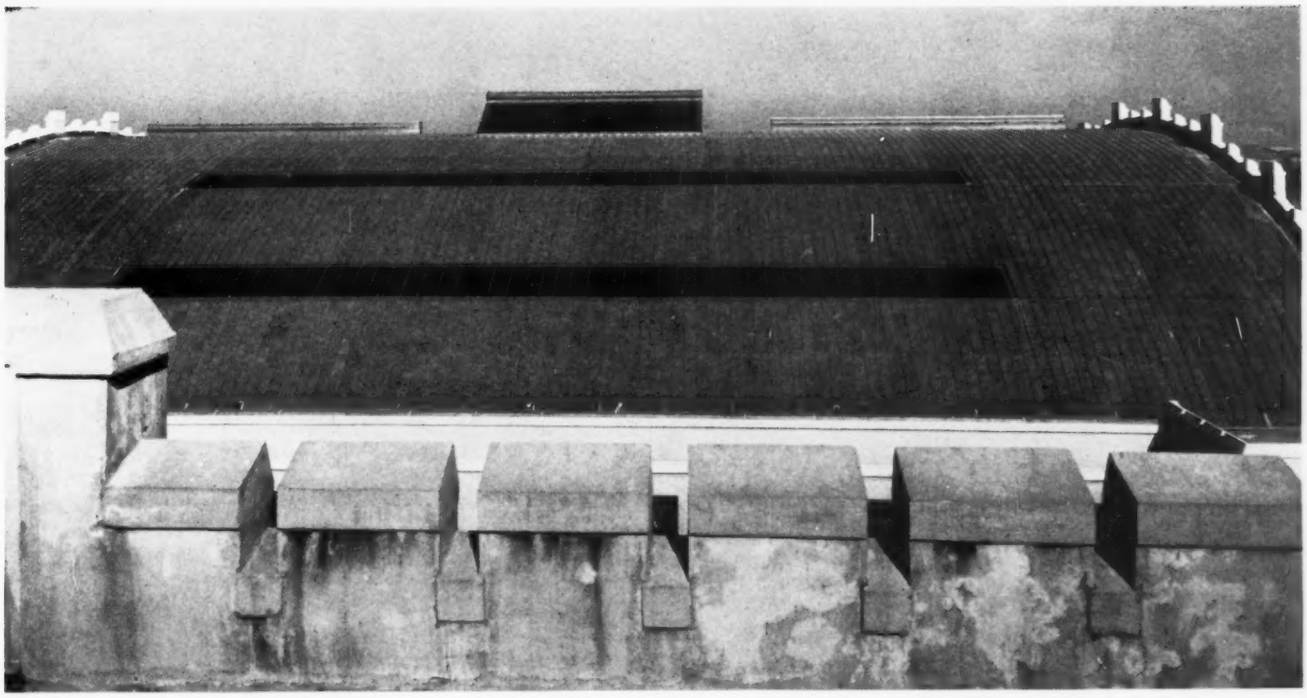
The building was designed by Lockwood Greene Engineers, Inc., of Spartanburg, S. C.; the Southeastern Construction Company of Charlotte, N. C., was general contractor; Ingold Company, Inc., Hickory N. C., were sheet metal contractors.

More than 400 squares of 16-ounce Anaconda copper were required for the roof. While the roof, in general, is of conventional construction—standing seam, using 20 by 96-inch sheets, there are numerous special features in the gutters, skylights, expansion joints and seaming.

Copper Application on Roof

As the roof plan and roof photograph show, the copper was laid in 18 courses across the roof—nine courses on each half. From gutter to ridge double-locked standing seams 1 inch high run continuously, broken only by the skylights. On the lower half of each side, where the pitch is steep, all horizontal, cross seams are single locked and leaded. On the


Crimped copper Cleats
Gutter expansion joint
Not soldered
Solder seam
3×6 Nailer
Steel truss
1" 2½ Planks
1" Movement
Cleat longitudinal seams in gutter.
SECTION X-X
SECTION Y-Y
190'
T. & G. ROOF
Flat Seams 16×20 Sheets
Standing seam 20 Sheets, seams 17" apart single lock cross seams
Standing seam roof cross seams double locked
Standing seam single cross
Standing seam lock seams
Flat seam
200'
36'6" Gutter ex.p. joints
Flat sky lights
Ventilator
Hip sky light
High standing seam
Flat sky light
Copper roof
Copper gutters
T & G ROOF
PLAN OF ROOF
Copper cleats 4'-0" long continuous.
Crimped copper
DETAIL-H
Copper gutter
DETAIL-J
SECTION A-A
Glass
SECTION B-B
SECTION C-C
SECTION D-D
High standing seam
Form
SECTION E-E
This plank to halve difference in angles of roof
24
10½
3×6 Nailer
13/16
SECTION G-G
Where angle of deck changes
3"
SECTION F-F
Vent Curb



This closeup of the roof and the page of details preceding, show all the interesting applications of copper on the large roof area. Especial attention is called to the interesting provisions for expansion and contraction.

upper half of each side, where the roof flattens out, all horizontal, cross seams are double locked but not leaded. In no place, however, are the horizontal seams soldered. This precaution to double lock the upper seams was taken to insure water tightness in the area where water may stand during heavy rains.

The copper all over the roof is laid on a 2⅛ inch splined board deck covered with a 15-pound asbestos felt.

Cleating Methods

Sheets were secured with copper cleats spaced not more than 12 inches apart and generally about 10 inches apart. Two copper nails were used in each cleat and the copper cleat was turned back over the nail head. Solder was used only around the flashings at skylights and ventilators and on some small flat areas of roof above side doors which are covered with 14 by 20-inch copper sheets, flat locked and soldered.

Horizontal Expansion Joints

One of the interesting features is the type of horizontal expansion joint used. These expansion joints run the full length of the roof on the line of the bottom of the skylights (see roof plan). On the upper and flatter areas of the roof, in other words from the upper edge of the top skylight to the ridge, it was not considered advisable to include an expansion joint. However, the top expansion joint and the provision for expansion along the ridge were considered sufficient to allow for movement since each individual sheet can move. Also, the roof was laid during the hottest summer months, when expansion was at the maximum point, so the only movement anticipated will be contraction.

The horizontal expansion joints are shown in detail A-A. To make this joint a 2 by 12-inch plank was split diagonally and nailed to form a step in the roof. Sheets above the step were turned down over the nose; sheets from the course below are bent short of the bottom of the step and turned up to single lock with the sheet above. This permits movement up and down along the step.

Skylight-Roof Connection

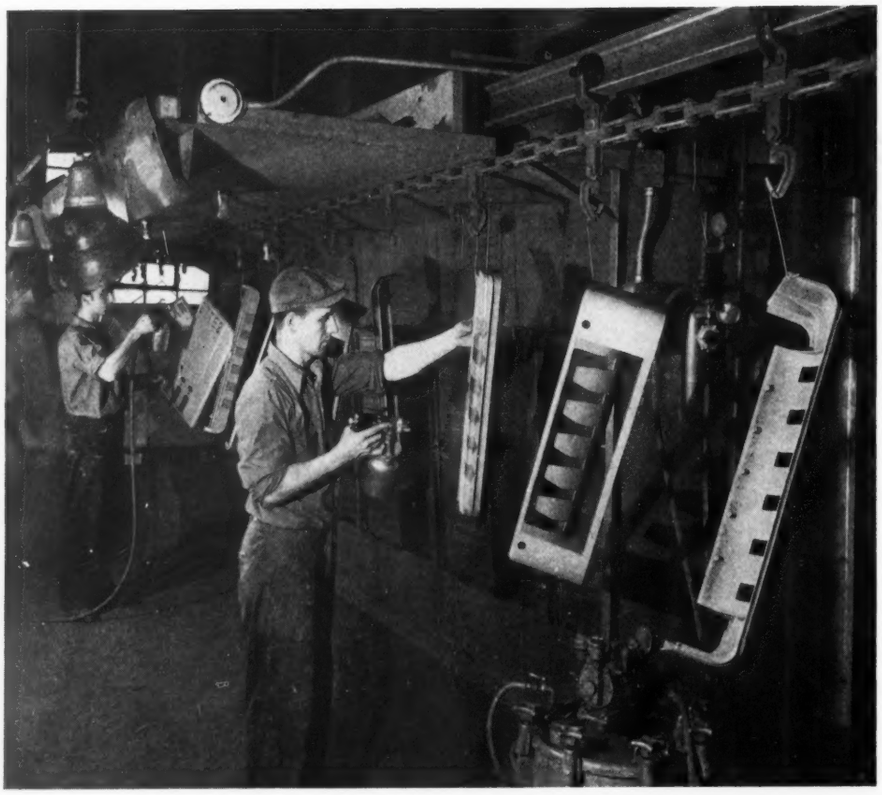
Where the skylights are cut through the roof, the top and bottom edges of the skylight are formed in the copper as shown in details B-B and C-C. Along the top of the skylight (C-C) the roof copper is single locked to a wide apron flashing which extends down over the glass. At the bottom edge of the skylight (B-B) the copper of the roof is carried up under the glass and turned back around the angle which forms the lower frame of the skylight.

The ridge is broken by one hip skylight and by two ridge type ventilators. The skylight is flashed and soldered to the roofing copper; the ridge ventilators have a high curb against which the roofing sheets are turned up and locked to the flashing of the ventilator. (Detail F-F.)

Gutter Construction

The wide box gutters are made integral with the roof. Detail X-X shows a cross section of the gutter. Because of the girth, two double locked and soldered longitudinal seams are incorporated. The face of the gutter is carried up to the top of the parapet as shown. Special attention was given to this point in the roof to insure anchorage against the violent wind storms which sometimes visit Charleston. To insure safety the edges of the copper gutter are double locked to a wide coping cap

(*Continued on page* 146)



Operators spraying vending machine pieces. Photo by courtesy of Binks Mfg. Co., Chicago.

Spray Finishing Methods

By Willoughby G. Sheane
Chemical Engineer

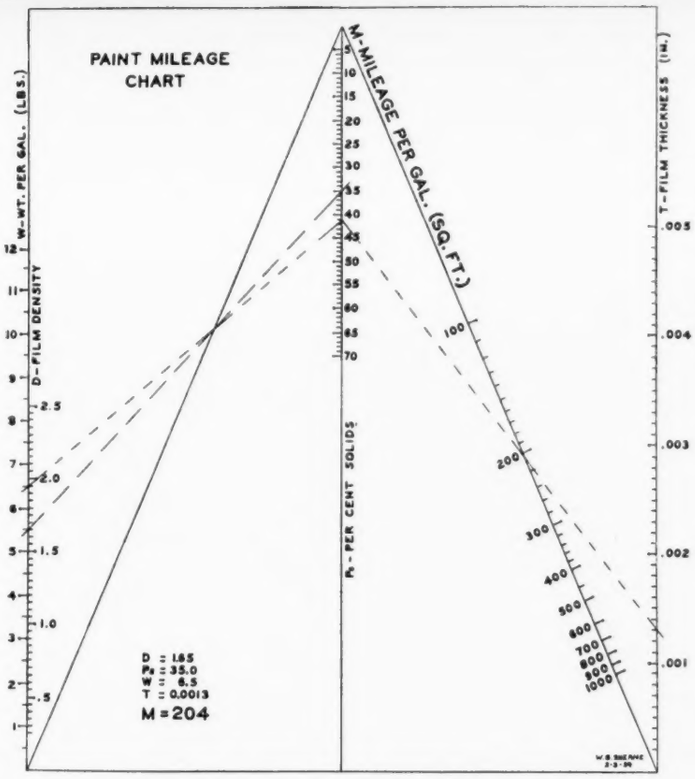
TO secure the maximum in spray finishing production at a minimum of material cost, it is obviously necessary that proper equipment be used and that correct material conditions be maintained. More important, however, in the application of an organic finishing material to any piece, is the procedure followed. It is the purpose of this discussion to present a number of the fundamentals in the method of spray finishing, by means of which material and labor utilization may be increased and uniformity insured.

Losses, Uniformity and Time

In general three interrelated factors influence the overall efficiency of any spray finishing operation. They are, first, the overspray losses, second, the uniformity of the applied film thickness; and finally, the proportion of finishing time devoted to actual spraying. Fortunately, this threefold problem has a single answer in the technique of handling the spray gun. Where to start and stop the gun, how to hold the gun and how to move the gun—these constitute technique and largely contribute to fixing the cost of spray finishing, from both the labor and material standpoints. By understanding and stressing the proper technique, total costs can be reduced through lower material consumption per unit finished, fewer rejects and greater production per operator-hour.

Gun Position

Spray guns operate most efficiently when held in the position for which they were designed, namely,



Paint mileage chart prepared by the author.

normal to the surface being finished. Tilting and canting do not allow the deposition of uniformly distributed atomized particles as shown in Figs. I, II and III, which represent various irregular spray patterns and the gun positions producing them. An off-normal position may produce heavy film sections, with consequent sagging and rejects, or light or pebbly areas may result, necessitating further passes of the gun to accomplish hiding or leveling. In addition, large volumes of material may be lost in overspray, and this in combination with the restroking to level or hide light portions of the

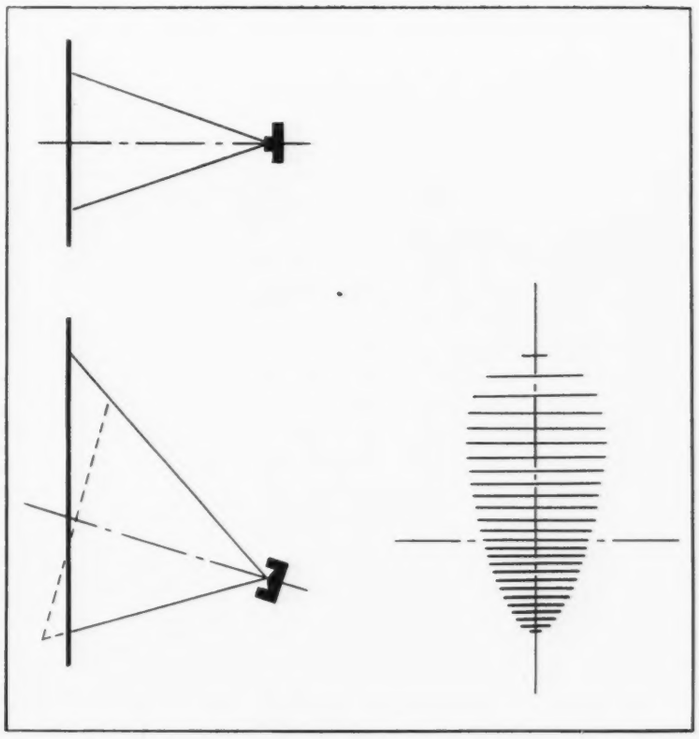


Fig. 1—Incorrect off-vertical gun position and resulting spray pattern.

film will reduce productivity through the spraying of unproductive material.

Figs. IV and V show the correct normal gun position and the uniformity of spray pattern which is obtained.

The points mentioned above, however, do not infer that the gun may not be held in various posi-

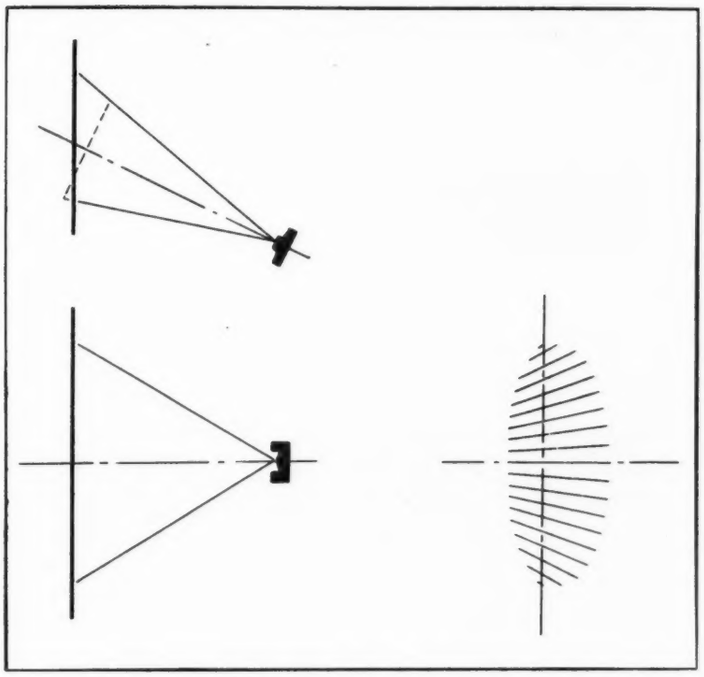


Fig. 2—Incorrect off-horizontal gun position and resulting spray pattern.

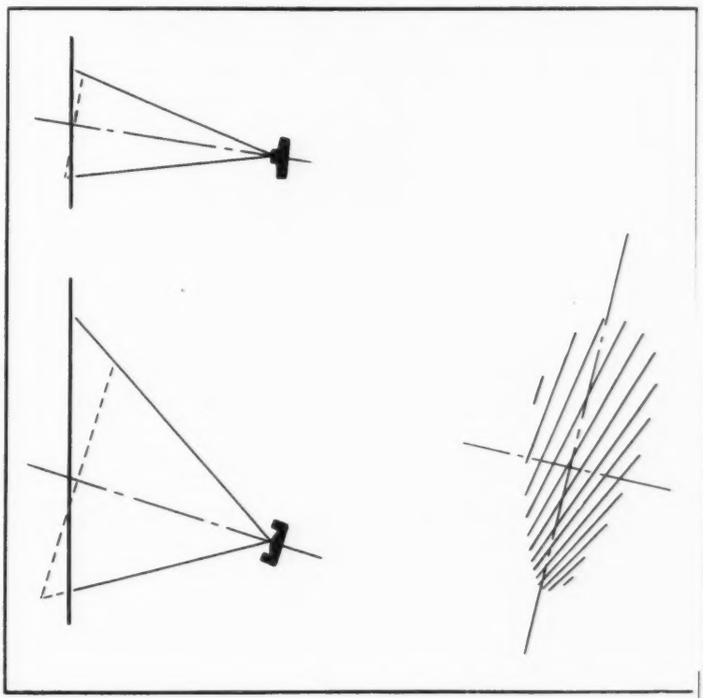


Fig. 3—Incorrect combination gun position and resulting spray pattern.

tions revolving about an axis through the gun and perpendicular to the surface being sprayed. On the contrary, this procedure is entirely in good order in those cases where production schedules do not allow changing the gun adjustments to accommodate sections of varying width. By turning the gun on its normal axis, more of the spray pattern may be utilized and overspray losses minimized. Figure VI illustrates the greater utilization obtained by turning the gun so that more of the material strikes the surface.

Gun Distance

Equally as important as gun position is gun distance, that is, the distance from the gun nozzle to the surface being finished. For any particular combination of material viscosity, air and fluid pressures, nozzle adjustment, etc. there is an optimum distance which will allow the atomized particles to strike the surface in the proper distribution and

Fig. 5—Photograph of a correct spray pattern.

condition to give a smooth, level film. This distance must be maintained within comparatively close limits if consistently good results are to be obtained. To hold the gun closer than the ideal distance is to deposit overly wet material in high concentration per unit area and sagging may result. On the other hand, to exceed this distance allows over-drying of the atomized particles, a condition

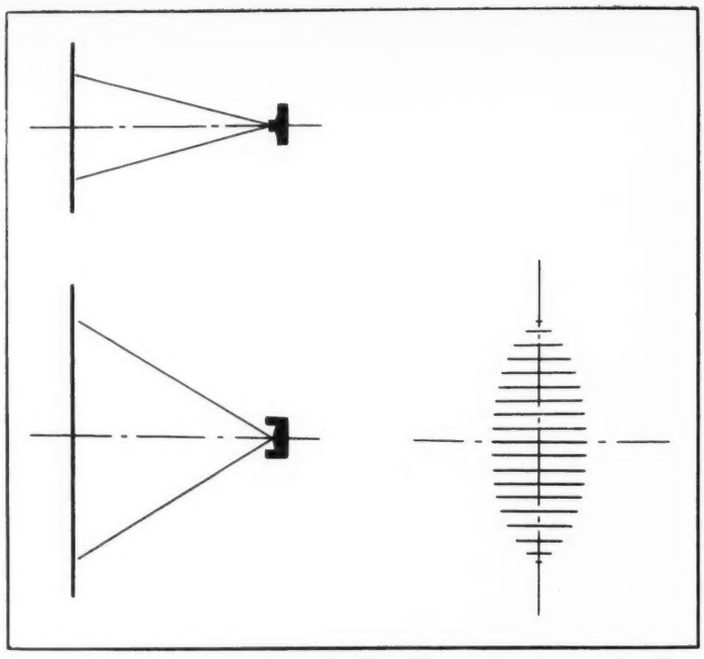


Fig. 4—Correct normal gun position and resulting spray pattern

contributing to excessive overspray, pebbliness and thin, non-hiding films.

Gun Motion

A simple analysis of spray gun construction and operation will show that absolute uniformity of motion relative to the piece being finished is necessary to obtain the maximum effectiveness with the least operator effort. All other factors being equal

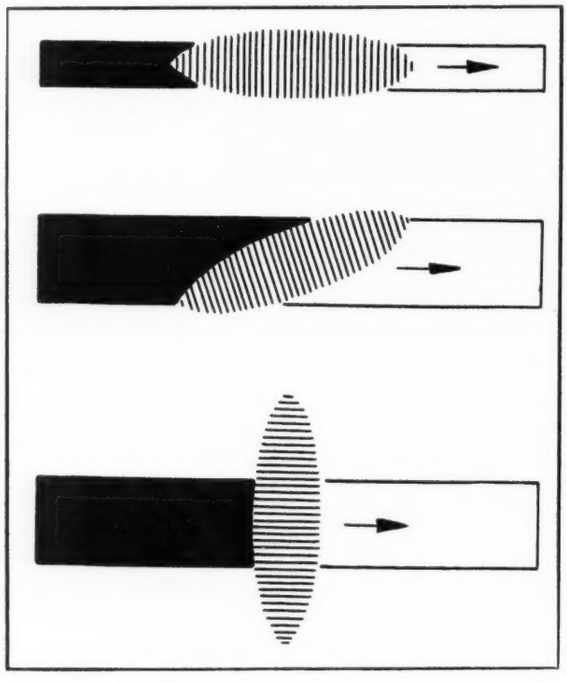
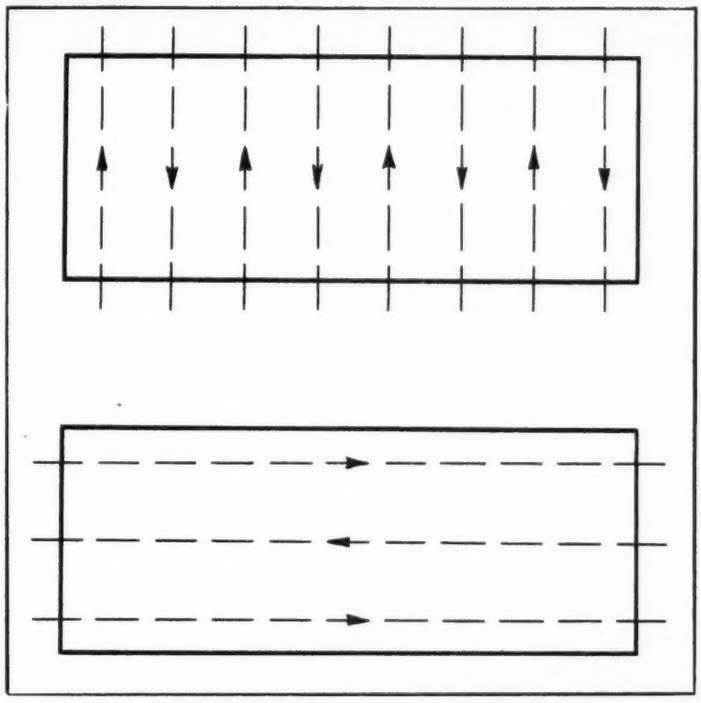


Fig. 6—Pattern utilization obtained by turning the gun on its normal axis so that more material strikes the surface.



Top, Fig. 7—Incorrect short stroke technique creates overspray losses. Below, Fig. 8—Long stroke technique showing reduced overspray loss.

and properly controlled, the volume of finishing material delivered per unit area per unit of time is dependent on the rate at which the gun moves across the surface. It is apparent, therefore, that a jerky technique may cause light or dry areas, or sags, along with rejects, wasted effort and other ills attendant to films which are faultily applied.

The continuity of gun travel also exerts considerable influence on the efficiency of the spraying operation. From a study of Figs. VII and VIII, which show short and long stroke technique on the same area, it is apparent that greater overspray losses accompany short strokes since the gun is directed off the piece a greater number of times. The constant triggering as the gun approaches the edges of the piece and the many and abrupt changes in direction are tiring to the operator and lower efficiency. In addition, because short, fast strokes do not allow as complete control of the gun as do long, continuous motions, the path followed tends to become curved, thus changing the distance from the gun to the surface, with effects as noted under Gun Position. Fig. IX illustrates this point.

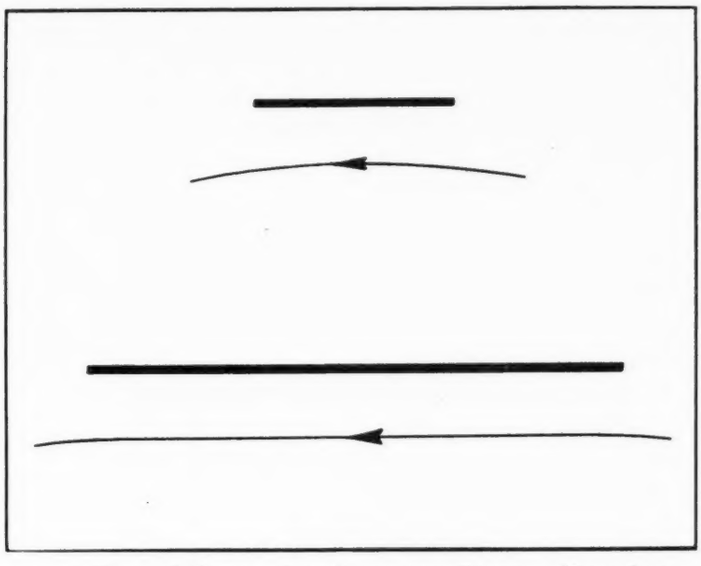


Fig. 9—Influence of stroke on gun distance. Short, fast strokes do not permit complete gun control.

The principles of gun motion are shown in combination in Fig. X, the general idea being applicable to any piece of reasonable contour and size with obvious advantage. The path, beginning in the upper right corner, takes advantage of the longest dimensions of the piece and permits constant gun motion through one continuous stroke. Triggering is reducted to a minimum and thus the bulk of the finishing time can be devoted to spraying.

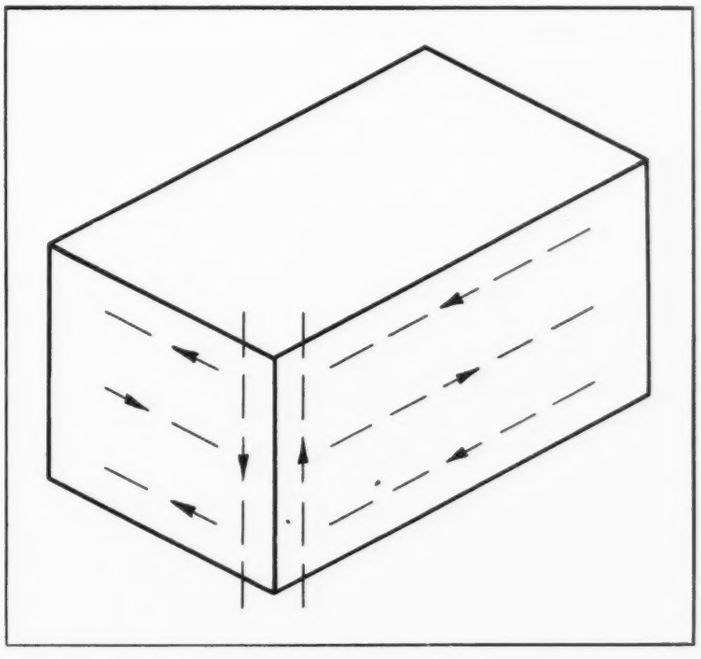


Fig. 10—Correct, continuous technique takes advantage of the longest dimensions of the object and continuous gun motion.

Conclusions

Correct spraying technique is a combination of proper gun position, gun distance and gun motion. The deposition of a uniform film with a maximum of labor and material utilization will depend on the extent to which the following rules are applied:

1. The gun must be held in a position normal to the surface being sprayed, although it may be turned on its normal axis to take full advantage of the spray area.
2. The gun must be held at a constant distance from the surface being sprayed.
3. The gun must be moved at a constant rate across the surface being sprayed and in as long strokes as possible.

Manufacturing Technique for the Fabrication of

Sheet Metal Cabinet Work

By F. E. Elliot
The Riester & Thesmacher Co., Cleveland

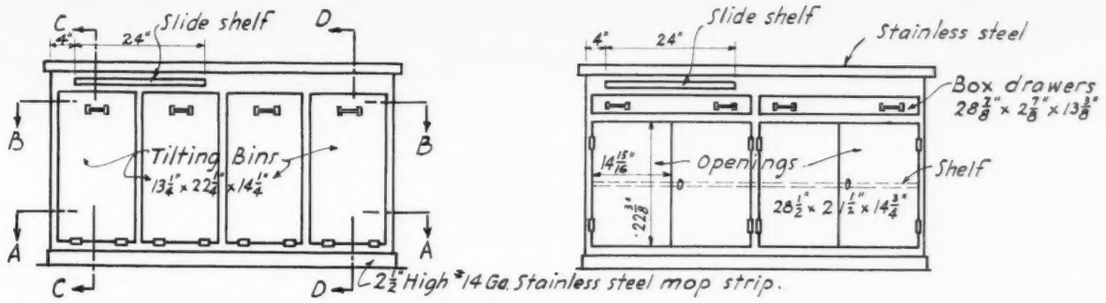
THE Riester and Thesmacher Company, Cleveland, devotes a considerable portion of its facilities to the fabrication of special and standard sheet metal cabinet work. A technique has been worked out which insures constant supervision of each manufacturing operation and maintains a complete schedule of material required for each part which makes up the finished product. Such control, we feel, is highly essential for the successful production of items of this type.

Our method of handling engineering design, manufacturing and product costs can best be illustrated by an example. The accompanying photograph and drawings show a metal cabinet installation recently designed, manufactured and installed in St. Alexis Hospital, Cleveland.

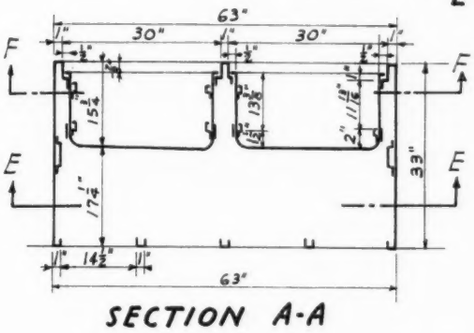
The first problem was space limitations. Space had to be conserved, yet many materials, of many types, had to be stored. Considerable planning was required to fit the cabinets into the room. The photographs illustrate what was accomplished and, in general, the different units installed. The room in which the equipment was installed is a Central Dressing Room, where surgical dressings are prepared. All materials, utensils and accessories are sterilized before being brought to this room.

Preliminary drawings were made up to show the equipment which would provide the desired storage capacity and where the units would be placed and these drawings were submitted with the proposal. These same drawings were used to estimate our work.

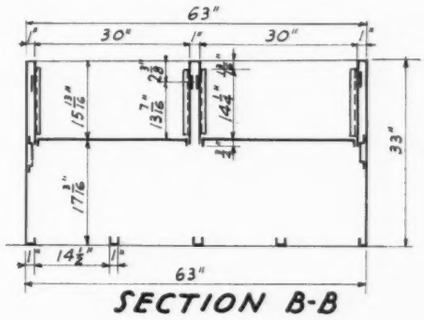
The center table, with bins, drawers and stainless steel top, selected to show the detail necessary for manufacture. On the facing page this cabinet is shown in complete detail just as the R & T engineering department prepared the drawings for manufacture. The seeming minute detail is necessary since the cutting sheets, as shown on following pages, are made from these drawings.



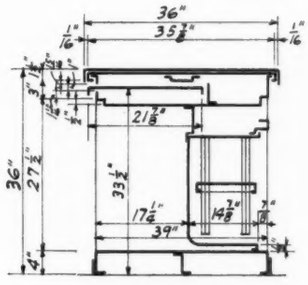
ELEVATIONS



SECTION A-A



SECTION B-B



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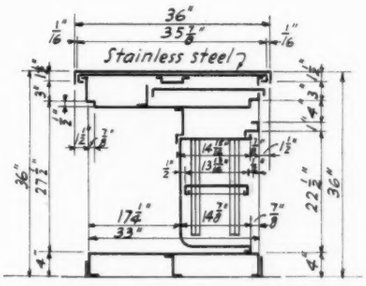

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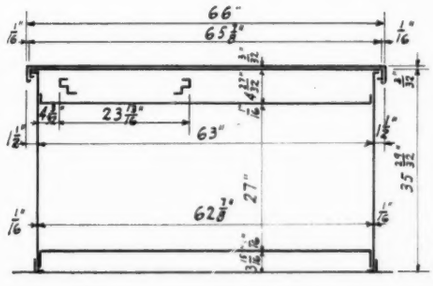

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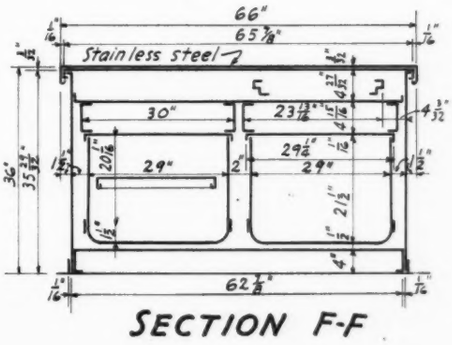
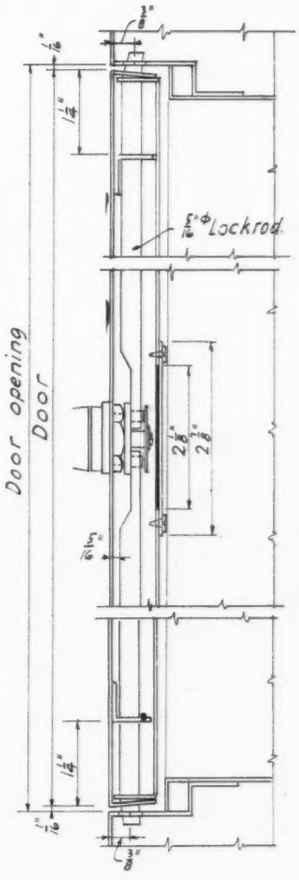
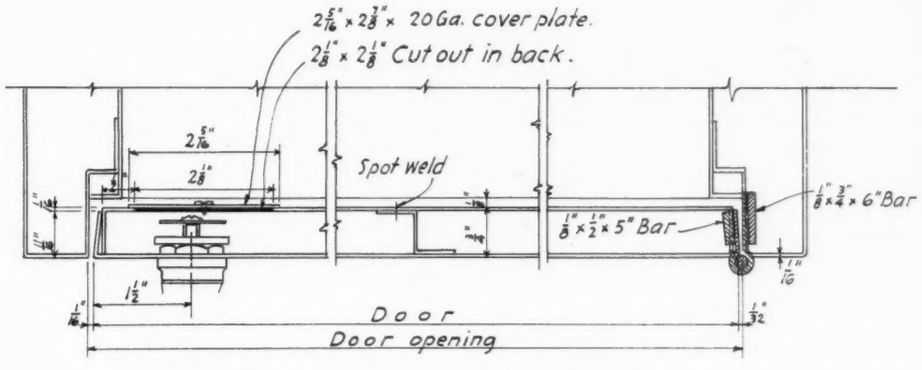


SECTION F-F

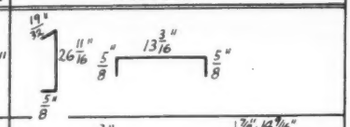
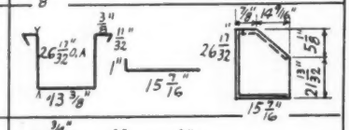
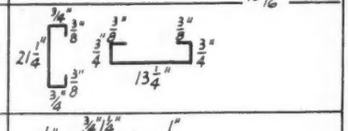
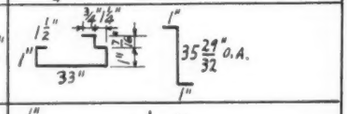
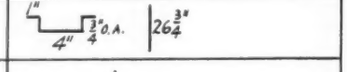
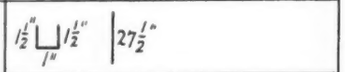
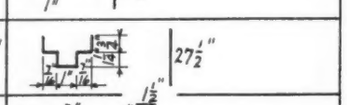
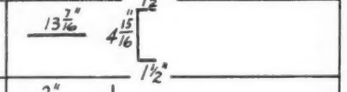
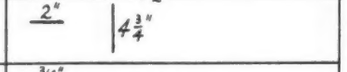
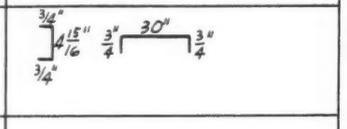
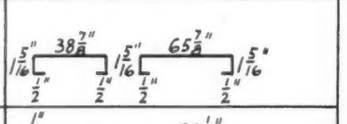
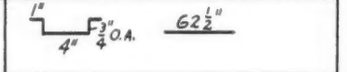
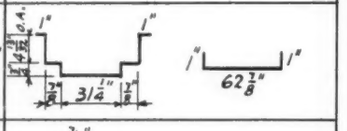
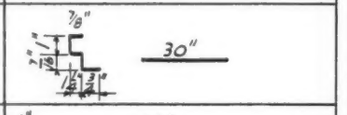
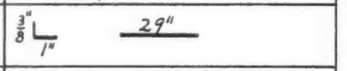
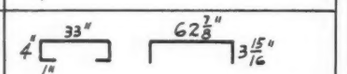
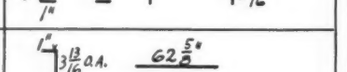
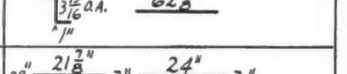
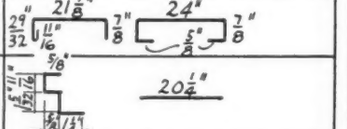
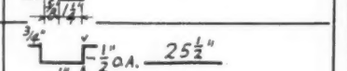
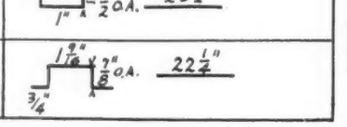


VERTICAL SECTION THROUGH DOORS

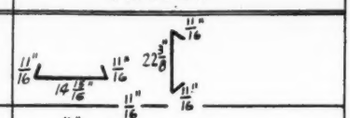
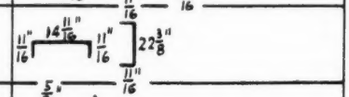
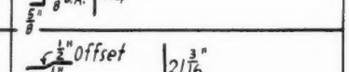
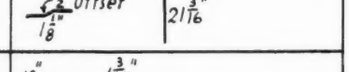
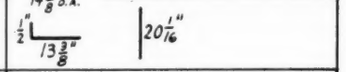
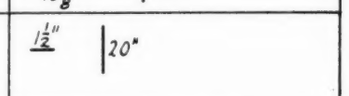
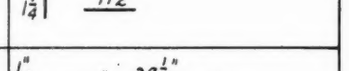
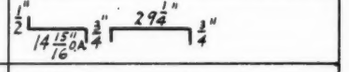
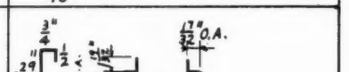
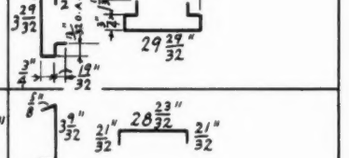
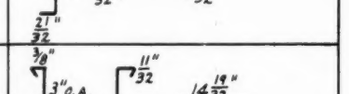
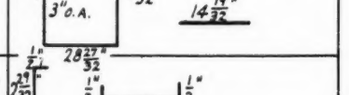
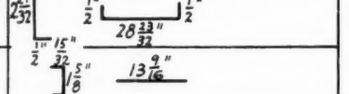
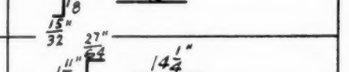
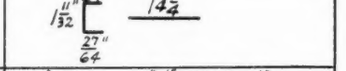
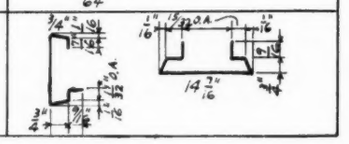


HORIZONTAL SECTION THROUGH DOORS

CUTTING SHEET

Pieces	Ga.	Location	Shearing Size	Sketch
4	H.R.P. 18	Bin Heads	$27\frac{23}{32}$" × $14\frac{1}{4}$"	
4	H.R.P. 18	Bin Bodies	$67\frac{1}{2}$" × $16\frac{11}{32}$"	
4	H.R.F 18"	Bin Backs	$23\frac{1}{8}$" × $15\frac{1}{8}$"	
2	Auto 16	End Panels	$38\frac{1}{2}$" × $37\frac{23}{32}$"	
2	H.R.P 16	End Panel Reinf.	$7\frac{1}{8}$" × $26\frac{3}{4}$"	
3	Auto 16	Center Channels	$3\frac{13}{16}$" × $27\frac{1}{2}$"	
1	Auto. 18	Front Filler	$5\frac{9}{16}$" × $27\frac{1}{2}$"	
4	H.R.P. 18	Uprights of drawers	$13\frac{7}{16}$" × $7\frac{3}{4}$"	
4	H.R.P. 14	Upright splices	2" × $4\frac{3}{4}$"	
2	H.R.P. 18	Back at drawers	$6\frac{1}{4}$" × $31\frac{5}{16}$"	
1	Auto 16	Steel Top	$39\frac{1}{8}$" × $69\frac{1}{8}$"	
1	H.R.P. 14	Top Reinf.	9" × $62\frac{1}{2}$"	
1	H.R.P 16	Front Filler & Top	$44\frac{5}{16}$" × $64\frac{11}{16}$"	
2	Auto 18	Center Rail	$4\frac{1}{16}$" × 30"	
2	H.R.P. 18	Body to Base Angle	$1\frac{9}{32}$" × 29"	
1	Auto 16	Base	$42\frac{5}{8}$" × $70\frac{9}{16}$"	
1	H.R.P. 16	Base Reinf.	$58\frac{5}{8}$" × $62\frac{5}{8}$"	
2	Auto 16	Slide shelves	$24\frac{5}{32}$" × $26\frac{5}{8}$"	
4	Auto 14	Shelf Runners	4" × $20\frac{1}{4}$"	
2	H.R.P. 14	Runner spreadrs.	3" × $25\frac{1}{2}$"	
2	H.R.P. 14	Bumper Saddles	$4\frac{5}{16}$" × $22\frac{1}{4}$"	

CUTTING SHEET

Pieces	Ga.	Location	Shearing Size	Sketch
4	Auto 18	Outside Door	$16\frac{1}{8}$" × $22\frac{9}{16}$"	
4	Auto 18	Inside Door	$15\frac{7}{8}$" × $23\frac{5}{16}$"	
4	H.R.P 20	Door Stiffener	$1\frac{3}{4}$" × $21\frac{3}{4}$"	
2	H.R.P. 14	Door Battens	$1\frac{1}{8}$" × $21\frac{3}{8}$"	
4	H.R.P. 16	Lock rod guides	$1\frac{3}{32}$" × $1\frac{3}{32}$"	
8	H.R. Bar	Hinge Reinf.	$\frac{1}{8}$" × $\frac{3}{4}$" × 6"	On case
8	H.R. Bar	Hinge Reinf.	$\frac{1}{8}$" × $\frac{1}{2}$" × 5"	On door
4	H.R. Rod	Lock rods	$\frac{5}{16}$"ϕ × $11\frac{3}{8}$"	
2	H.R.P 18	Shelves	$16\frac{5}{8}$" × $31\frac{5}{16}$"	
2	Auto 18	Bottom & Back	$36\frac{7}{16}$" × $31\frac{5}{16}$"	
4	Auto 18	Sides	$13\frac{25}{32}$" × $20\frac{1}{16}$"	
4	H.R.P. 14	Side Splices	$1\frac{1}{4}$" × 20"	
4	H.R.P. 14	Bottom splices	$1\frac{1}{4}$" × $11\frac{1}{2}$"	
2	Auto 18	Case Tops	16" × $30\frac{9}{16}$"	
2	Auto 20	Drawer Fronts	$68\frac{5}{8}$" × $33\frac{11}{32}$"	
2	H.R.P. 22	Drawer Hoods	$4\frac{15}{32}$" × $29\frac{15}{16}$"	
2	H.P.P. 20	Drawer Bodies	$36\frac{1}{32}$" × $14\frac{19}{32}$"	
2	H.R.P. 18	Drawer Backs	$3\frac{23}{32}$" × $29\frac{17}{32}$"	
4	Auto 14	Drawer Tracks	$2\frac{5}{16}$" × $13\frac{9}{16}$"	
4	Auto 14	Case Tracks	$1\frac{15}{16}$" × $14\frac{1}{4}$"	
4	Auto 18	Bin Fronts	$29\frac{1}{8}$" × $17\frac{9}{16}$"	

CUTTING SHEET

Pieces	Ga.	Location	Shearing Size	Sketch
2	H.R.P. 12	Shelf stops at Rear	$4\frac{11}{32}$" × 24"	3" × $1\frac{1}{2}$" — 24"
2	H.R.P. 12	Bumper Angles	$1\frac{29}{32}$" × 8"	$1\frac{1}{4}$" — $\frac{13}{16}$" — 8"
2	Stain. Steel 14	Mop strip	$2\frac{1}{2}$" × $95\frac{1}{8}$"	$2\frac{1}{2}$" — $\frac{3}{32}$" — $16\frac{3}{32}$" — $63\frac{3}{16}$"
1	Stain. Steel 22	Top	$39\frac{29}{32}$" × $69\frac{29}{32}$"	$1\frac{1}{2}$" — 36" — $1\frac{1}{2}$" — $\frac{1}{2}$" — 66" — $\frac{1}{2}$" — $1\frac{1}{2}$"
16	R & T Special Hospital Hinges			
2	Knob Latches - Nat. Lock Co. #68019			
8	Drawer Pulls - " " " #0166			
8	Shelf-Brackets " " " #57002			
8	Shelf Standards - $20\frac{1}{2}$" Long - Nat. Lock Co. #57001			
4	Bullet Catches - W. Bingham #22 P			
20	Rubber Bumpers for Doors & Drawers - In stock			
8	" " " Slide Shelves - " "			
4	Drawer Stops - Right & Left - " "			
4	" Stop studs			

ESTIMATE SHEET

Quantity	Description	Weight Each	Weight Total	Mat. or Schedule Each	Mat. or Schedule Total	Hours Each	Hours Total
	Elevation # 8		in Lbs.				
4	Bins 15"×24"×16"		120				32.0
2	Openings 30"×25"×18"		90				16.0
8	Adj. Racks 25" Long				.24		.5
2	Shelves 30"×18"		18				3.0
8	Shelf clips				.08		—
2	Prs. Doors 30"×25"		52				14.0
16	Hinges				4.80		8.0
2	Operating Handles				1.60		2.0
4	Bullet Catches				.40		1.0
2	Finished Ends 36"×36"		56				8.0
4	Reinf. for Ends 36" Long		8				2.0
3	Bin spacers #16 Ga. × 3" × 30"		10				4.0
17'-0"	$2\frac{1}{2}$" #14 Ga. Stain. steel Mop strip	12#		.65	7.80		2.0
28	Rubber door bumpers				28		3.0
1	Semi Finished Top 39"×66"		26				4.5
1	Stain. Steel Top #20 ga. 70"×43"	37#		.65	24.05		8.5
3	Reinf. for Top 66" Long		12				3.0
4	Slide Shelves		60				16.0
8	Uprights #18 ga. × 8" × 24"		24				9.5
2	Drawers 36"×6"×22"		36				8.0
2	Channel Suspensions		10				4.0
4	Drawer Pulls				1.20		1.0
1	Base #14 ga. × 46" × 70"		90				7.0
3	Reinf. for Base 66" Long.		52				2.0
	Paint				5.00		8.0
	Total	664#		@.035	23.24		
	Material				$68.69		167.0
							Total Hrs.

On the facing page and above are the Cutting Sheets necessary for the combination table and cabinet. Each metal piece required is itemized, drawn in two cross sections and completely dimensioned. Above, right—is the Estimate Sheet for Item 8 (this particular cabinet) showing the weight of material by required pieces, the cost of the material and the total labor hours required for the cabinet.

General Features of R&T Units

The features built into the units provide cupboards with adjustable shelves, box drawers, sliding shelves and tilting bins. Table tops, counters and ledges are all covered with 20-gauge stainless steel formed and applied over a 16-gauge sub top. A layer of felt is cemented between the stainless steel and the sub top to act as a deadener. Transverse cross section F-F shows this construction; also the method of edging the stainless steel top. A 14-gauge stainless steel mop strip was provided around the base of each unit.

The cabinets are all finished in a baked, synthetic enamel in a light shade of green.

Construction Details

The design of all units follows our general standards for construction of units of this type. The cupboards have coved, inside corners at the bottom to facilitate cleaning. These rounded corners are a feature of our construction. All interior joints are built flush to prevent accumulation of dust. The cross sections show this construction. The round corner construction mentioned is accomplished without the use of any special dies. To obtain this, the back and bottom are notched at the cove and formed in one piece. The two sides of a cupboard are flat sheets, formed at the front. The top is flanged over the sides and back and spot welded thereto. A lap strip is spot welded at the back of the joints at the bottom and vertical seam at the back. This bottom seam is polished smooth, while the vertical joint is covered with the adjustment strip for the shelves.

Doors, Drawers, Fronts

The hinged doors are built double wall, pan type with all corners welded. Detail drawings show vertical and horizontal cross sections of these doors.

Drawers are formed of pieces shown in the Cutting Sheets and are spot welded throughout. The top corners are welded.

The front frame on these units consists of an offset channel construction, applied to the interior of the unit. All joints in the frame are electric welded and then ground flush for appearance. This brief description emphasizes the construction features typical of the St. Alexis units and all R & T cabinets of the standard line.

Estimating Methods

It may be of some interest how cabinets of this type are estimated for material quantities and labor costs. Also, how machine operations are scheduled and parts required shown so that the shop can fabricate each piece needed. To illustrate office and shop procedure item number 8 has been selected. This is a combination cabinet, containing bins, cupboards, slide shelves, drawers and a full

work table top. Item 8 is the unit in the center of the floor in the photograph.

Estimating Schedule Saves Time

The task of estimating is simplified through the use of an estimating schedule which gives weights of the various pieces, together with labor factors in hours. Since this schedule is based upon weights and hours, it is simple to apply current material costs and labor rates. This is clearly shown by the Estimate Sheet reproduced for Item 8. Certain advantages of this system are believed obtained through breaking down the total cost to costs of the various units wherever possible. This saves considerable time should the customer request changes. These unit costs also permit comparison of the different costs on a square foot, linear foot or on a pound basis. This comparison often reveals an error or inconsistency in an estimate.

Material Summary Sheet

After the estimate is made up a summary sheet is prepared showing the total weights, material quantities and labor costs, to which is added factory overhead, erection cost, selling and administrative cost and profit. A summary of this kind gives a quick and accurate picture of net cost and is a great help to the person responsible for establishing the final selling price. Since final selling price must take into account labor and material cost and their ratio to net cost against total cost such a summary insures a complete picture. The total estimated labor hours also helps to determine the delivery promise and can also be used to schedule work through the factory.

Manufacturing Sequence

After receiving the order, it is turned over to the Engineering Department, which adds the construction details to the original preliminary drawings. A complete bill of material is then made, giving shearing sizes and sketches showing all bends. See Cutting Sheet for typical item, elevation No. 8. In making this bill of material the various sizes of a similar nature are segregated in groups to save time on layout and machine operations. This bill of material is turned over to the Works Superintendent who handles the job from there on.

Requisitions for materials purchased outside, other than metals, are also made by the Engineering Department and turned over to the Purchasing Department.

The factory operations are scheduled in the following sequences: shearing, layout, notching, punching, forming, spotwelding, sub-assemblies, gas and arc welding, grinding and polishing, final assembly and fitting, painting, hardware, assembly and inspection.

Copper Roof Has Unusual Expansion Provisions

(*Continued from page* 137)

(crimped copper) which is carried to the outside edge and double locked with a continuous copper cleat which is nailed under the coping cap to the coping plank. The cleat and the cap, after locking, are turned down against the outer face of the parapet. Detail X-X shows this construction clearly.

Provision for expansion longitudinally in the gutter is provided for by five expansion joints (see detail Y-Y). These are placed at 36-foot intervals at high points in the gutter. The detail X-X shows that the top of these expansion joints is just slightly higher than the outer edge of the gutter, but just a little below the longitudinal seam which joins the gutter to the roof. This seam is double locked, but not soldered. By this construction each 36-foot length of gutter is free to move longitudinally since each section is not fastened at any point in the 36-foot section. One of the roof photographs shows these expansion joints and the parapet capping just above the edge of the stone work. The photographs also show the large hip skylight and the ridge ventilators.

The designing engineers and the sheet metal contractor feel that these construction features will prevent any failure in this large roof expanse regardless of stresses caused by high temperatures, strong winds or other conditions.

Coming Conventions

1940

Jan. 17-18—Sheet Metal Contractors Association of Illinois. 27th Annual. Hotel Jefferson, Peoria, Ill. J. E. Peterson, Secy., 20 W. Hinsdale Ave., Hinsdale.

Jan. 22-24—National Warm Air Heating and Air Conditioning Assn. Hollenden Hotel, Cleveland. Allen W. Williams, Man. Dir., 5 E. Long St., Columbus, O.

Jan. 25-26—Sheet Metal Roofing, Heating and Air Conditioning Contractors' National Association. First Annual. Hotel Carter, Cleveland. Paul L. Biersach, Secy., 225 E. Michigan St., Milwaukee.

Feb. 9-10—Sheet Metal and Warm Air Heating Contractors' Association of Indiana, Inc. Annual Convention. Union Building, Purdue University. Paul R. Jordan, Executive Secretary, 631 S. Delaware, Indianapolis, Ind.

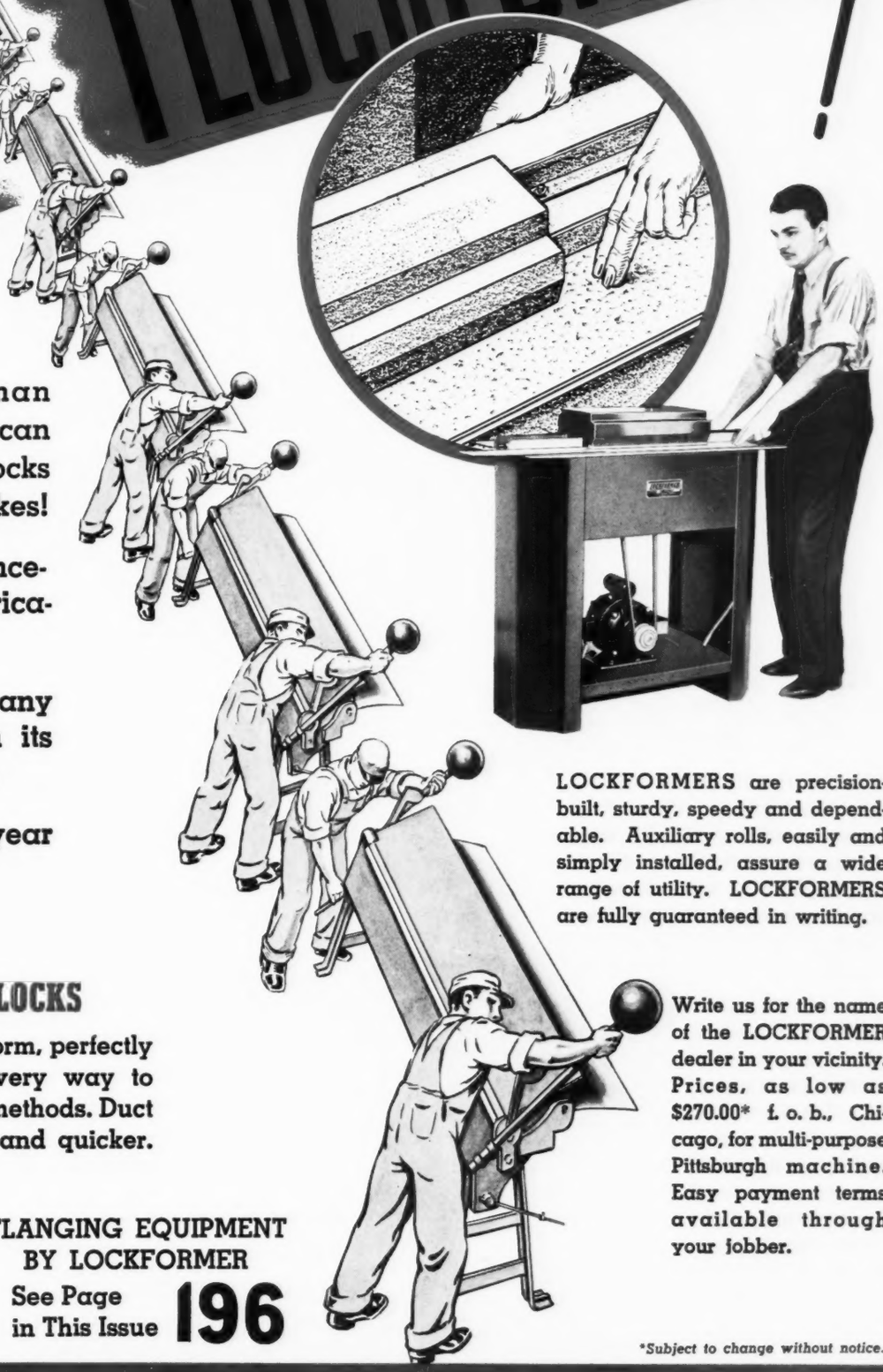
Feb. 12-14—Master Sheet Metal, Heating, Ventilating and Air Conditioning Contractors Association, Inc., Plankinton House, Milwaukee. Exhibits. Paul L. Biersach, Secretary, 225 E. Michigan St., Milwaukee.

Feb. 13-15—Ohio Sheet Metal Contractors Association. 26th Annual. Hotel Commodore Perry, Toledo. Henry C. Bitter, Secy., 218 Hotel Secor, Toledo.

Mar. 25-30—Forced Warm Air Conference. Ninth Annual Short Course. Michigan State College, East Lansing, Michigan. Professor L. G. Miller, Director.

Mar. 26-27—New York State Sheet Metal, Rfg. & Air Conditioning Contr. Assn., Inc. Annual with Exhibits. Hotel Martin, Utica, N. Y. Clarence J. Meyer, Secy., 569 Genesee St., Buffalo.

16 MEN or 1 LOCKFORMER!



That's Right! **One** man with a LOCKFORMER can form more Pittsburgh locks than **16** men at **8** brakes!

The most important advancement in sheet metal fabrication in 25 years.

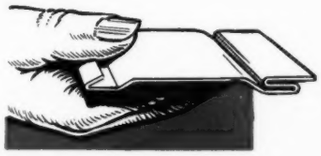
LOCKFORMER has, many times, saved more than its original cost on one job.

Make 1940 a profitable year with LOCKFORMER!

LOCKFORMERS are precision-built, sturdy, speedy and dependable. Auxiliary rolls, easily and simply installed, assure a wide range of utility. LOCKFORMERS are fully guaranteed in writing.

WRITE US FOR SAMPLE LOCKS

LOCKFORMER locks are uniform, perfectly formed, rigid, superior in every way to locks made by old-fashioned methods. Duct and fittings assemble easier and quicker.



FLANGING EQUIPMENT BY LOCKFORMER

See Page in This Issue **196**

Write us for the name of the LOCKFORMER dealer in your vicinity. Prices, as low as $270.00* f. o. b., Chicago, for multi-purpose Pittsburgh machine. Easy payment terms available through your jobber.

*Subject to change without notice.

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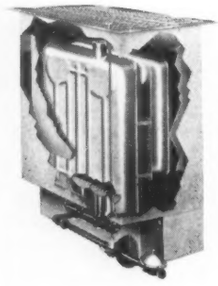
SEE OUR EXHIBIT
Sixth International Heating & Ventilating Exposition
Space No. 758-760

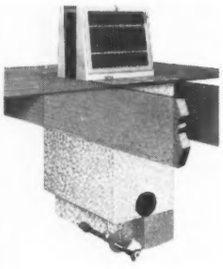
Pacific

THE "PROFIT LINE" FOR 1940



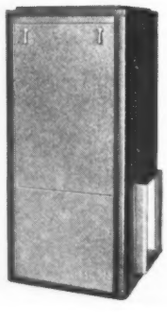
Floor Furnaces

Latest features and designs—die-formed heating element. Multi-tubular burner. Standard package control assemblies completely interchangeable. Various manual and thermostatic control combinations, meeting latest A.G.A. requirements. Four sizes. Limited stock meets all fuel requirements.



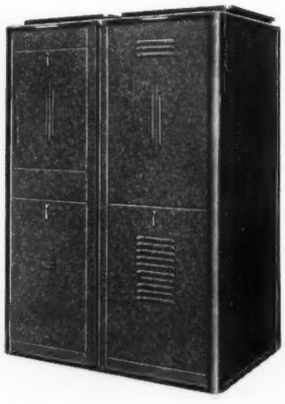
Dual Furnaces

Engineered for greater safety, efficiency, economy. Heats two rooms adjoining. Wall register boxes are "air insulated", directly over element. Streamlined for faster air flow! Furnace features and designs are identical with the floor furnace. Three new sizes. Complete with interchangeable burners and controls.



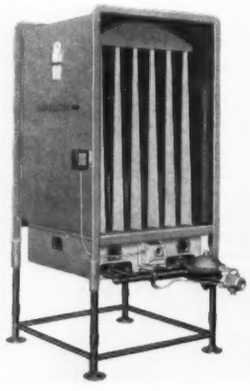
Cabinet Blowers

Complete with filters, adjustable V-belt drive, oilless bearings and motor, fully enclosed. Eleven cabinet sizes. Blowers only also available with or without motor and drive. A proven product that is fully guaranteed.



Winter—Summer Air Conditioner

Here is the "last word" in automatic gas heating and ventilating. Fully enclosed. Completely equipped. Special round element with cast iron fire box liner. Multi-tubular burner. Electric panel board simplifies control hook-up.



Heat Exchanger for Duct Systems

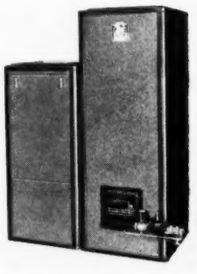
For new or existing ducts. Heats large volumes of air, quickly. Multi-tubular burner. Efficient, safe, economical. Sizes to meet all requirements in modern commercial and industrial systems.

Forced Air Unit

Compact, fully automatic heating and ventilating unit with air filters for homes and offices without basement. Adapted to first floor kitchen or "closet" installation, it is quiet and efficient. Also available with top louvers for use as floor type unit heater. Six sizes. Complies with latest A.G.A. Approval requirements.

Blower Furnace

Blower and furnace combined in low-cost, flexible unit for new and replacement field. Round element. Cast iron fire box liner. This is the blower furnace to specify for "low ceiling" jobs. A favorite everywhere with installers and contractors.



Cast Iron Blower Furnace

Special "finned" Everlast cast iron heating element and fire box. Blower and furnace compactly assembled in beautifully designed cabinet with removable panels for complete accessibility. Latest design and controls. Nothing finer for better class jobs in the coldest climates!

PACIFIC GAS RADIATOR CO.

MAIN OFFICE AND FACTORY
HUNTINGTON PARK • CALIFORNIA

"The Line of Least Resistance"

DEALERS

Write for 150-page catalog describing our complete line of furnaces, space heaters, water heaters and allied items. Valuable territory still open. Write or wire . . . NOW!

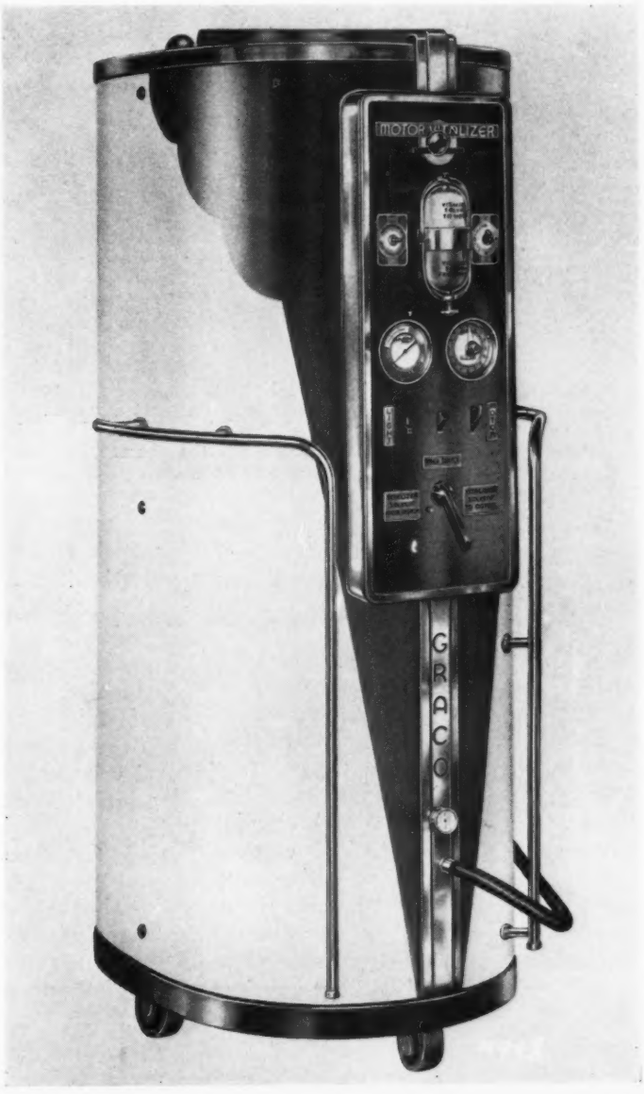
Ingenious Methods and Equipment Devised to Fabricate an Automotive Specialty

A very important problem of management in the sheet metal fabricating plant is the devising of methods and special "set-ups" which insure uniform and accurate operations and save fabricating cost at the same time. In Minneapolis, Stremel Bros. Mfg. Co., in fabricating specialties for automobile service stations have several truly ingenious developments adaptable to a variety of similar products. This article shows and explains the methods.

IN THE fabrication of automobile service station equipment sold by others, Stremel Bros. Mfg. Co., Minneapolis, has developed some unusual shop equipment and methods to reduce fabrication time while maintaining perfect workmanship.

The equipment fabricated consists of two units. One unit is a 16-gauge drum which must be an absolutely true circle without the seam showing. The other unit is a shield for the same machine which has a rectangular opening to provide for an instrument board which is not installed by Stremel.

Each one of these units had one special problem. To build units satisfactory to the client, Stremel worked out the special equipment and methods de-



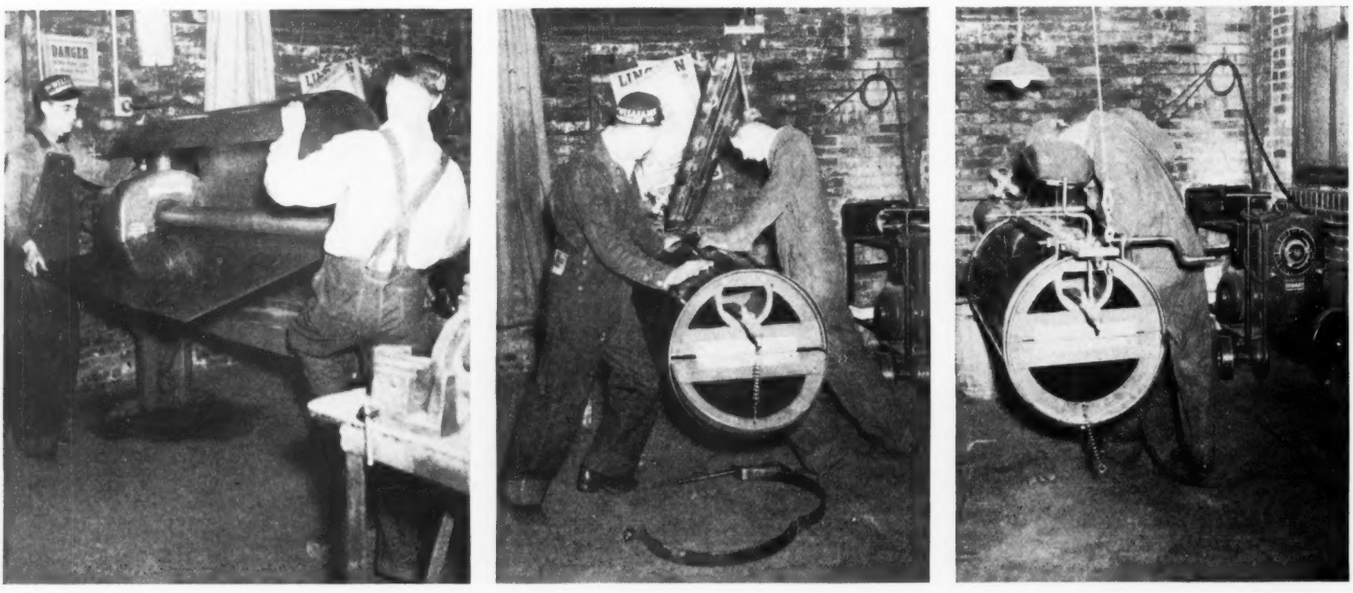
The finished product after the customer has the cabinet enameled and ready for shipment. The shield described is the front. The shield joins the drum along the line indicated by the vertical row of bolts. The highly finished exterior necessitates perfect metal formation.

scribed in this article. The drum, as stated, has to be a true cylinder. The seam running from top to bottom is electric welded and after welding there must be no distortion, nor must the weld show when a high gloss, white enamel is applied.

Special Analysis Steel Used

The drum is formed from 16-gauge automobile body stock. Special stock is purchased, specifying easy-rolling qualities so that there will be no fluting or distortion, yet the drum must hold its shape. The sheets are bought squared and cut to correct size.

First the sheets are passed through the power roll (see photograph) which approximately closes the drum. The rolled sheet is then placed upon the special welding jig shown in other pictures. This special jig has on one end (away from the camera) a fixed circular head. The end toward the camera is in two halves of which the lower half swings out and up to allow the sheet to be placed in position. The shoe is then swung down and into the roll and the drum is truly circular.



From left to right—Special analysis steel sheet, squared and bought to exact size, is rolled in the power rolls. Then the sheet (center) is placed on the truly cylindrical jig. The lower "shoe" swings out to admit the rolled sheet and is then locked in position. The clamping straps are tightened around the drum and the welding bar is clamped along the seam. The bar holds the two edges in perfect position and acts as a chill plate for welding.

Jig Holds Drum Truly Cylindrical

One photograph shows the clamping bar up in the air; another photograph shows the clamping bar locked in place to hold the two edges to be welded in exact alignment and perfectly flat. The same photograph also shows the two end, circular clamps which wrap around the rolled sheet over the end shoes and when drawn up by the hand crank shown fit the rolled sheet tightly to the drum form. When the rolled sheet is finally positioned on this jig the welder can weld from one end to the other without interruption and without any fear of an uneven seam or distorted metal. Distortion is further eliminated, by the heat conveying qualities of the clamping bar which acts as a double chill plate close to and on each side of the weld. Only enough sheet edge is left when the clamping bar is down to make the weld.

Stremel does not paint the drum, but the drum must be ready for painting. This necessitates grinding the weld to conform with adjacent metal which is done with flexible shaft grinders.

Shield Opening a Tricky Problem

The special problem of the shield occurs where the opening is cut to receive the instrument panel. At first this rectangular opening was cut in the flat sheet with an inside cutting shear, but in spite of every precaution this method resulted in fluting, flat spots and roughing the edge metal when the shield was rolled after cutting. Considerable experimentation developed the method now used which requires two special machine set-ups.

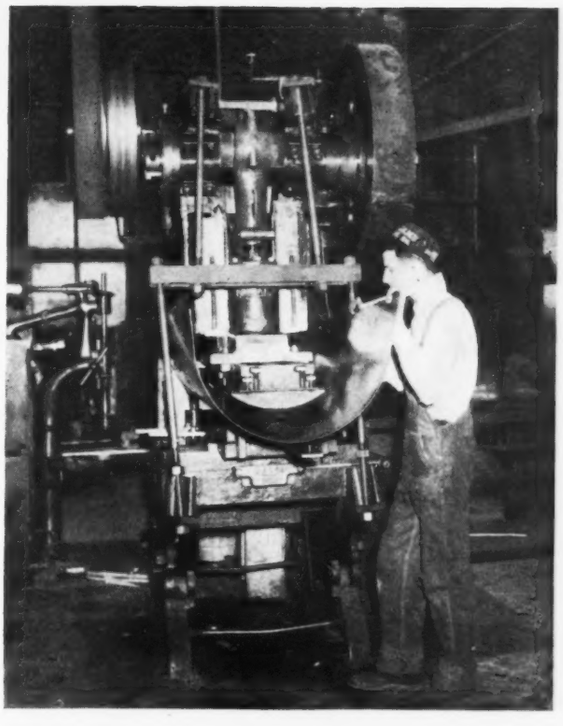
Absolute accuracy is necessary due to the fact that both shield and drum are placed on a special base and bolted together. Bolts welded on to the drum must fit through holes punched into the shields. This requires holding all dimensions to $\frac{1}{64}$ of an inch. This can be done only by special jigs. The jigs designed by Stremel Bros. for this job are simple and practical and represent the best in advanced sheet metal practice.

Special Roll "Irons" Shield to Shape

The 18-gauge automobile body stock sheet, also specified for easy rolling, is first placed in an ingenious roll shown in one of the photographs. This specially designed roll is necessary because the radius

Above — A special roll was developed to roll the special analysis "shield" sheets to approximate final shape. One end of the sheet has been clamped in position.

Right — the mechanics "iron" the sheet with the swinging roll as shown. A few backward and forward rolls gives the sheet proper shape.



Below — The rolled shield is punched for position marks and is then placed in the special setup on a power punch. A heavy cutting die, with cutting edges shaped to exact contour of the rolled sheet, cuts the control board opening in one stroke. There are no rough edges, no flat spots, no distortion, and no final hand finishing required after this punching operation.

of the circle starts about 8 inches from the edge of the sheet. With this special roll each sheet is rolled the same without any variation. One edge of the sheet is clamped at the bottom of the stationary forming drum as shown. Then the moving roll is swung around the stationary drum by two mechanics in an operation much like ironing the sheet onto the drum. The special analysis sheet permits rolling the sheet to the desired circle without the sheet springing out of shape when removed from the roll, yet the sheet possesses sufficient strength and rigidity.

Special Die Punches Opening

Rolled to approximate shape the sheet—still uncut—is placed in a special setup on a power punch. One of the photographs shows the rolled sheet in place for the punching operation. A special cutting die, with cutting edges shaped to conform with the arc of the rolled sheet where the cut is to be made, punches the rectangular opening in one stroke. The sheet, meanwhile, is held in exact position by small pins which fit into previously punched holes in the sheet.

This procedure gives an accurately placed and smooth opening without any rough edges, without any distortion, without any flat spots, thereby eliminating practically all later hand finishing around the opening.

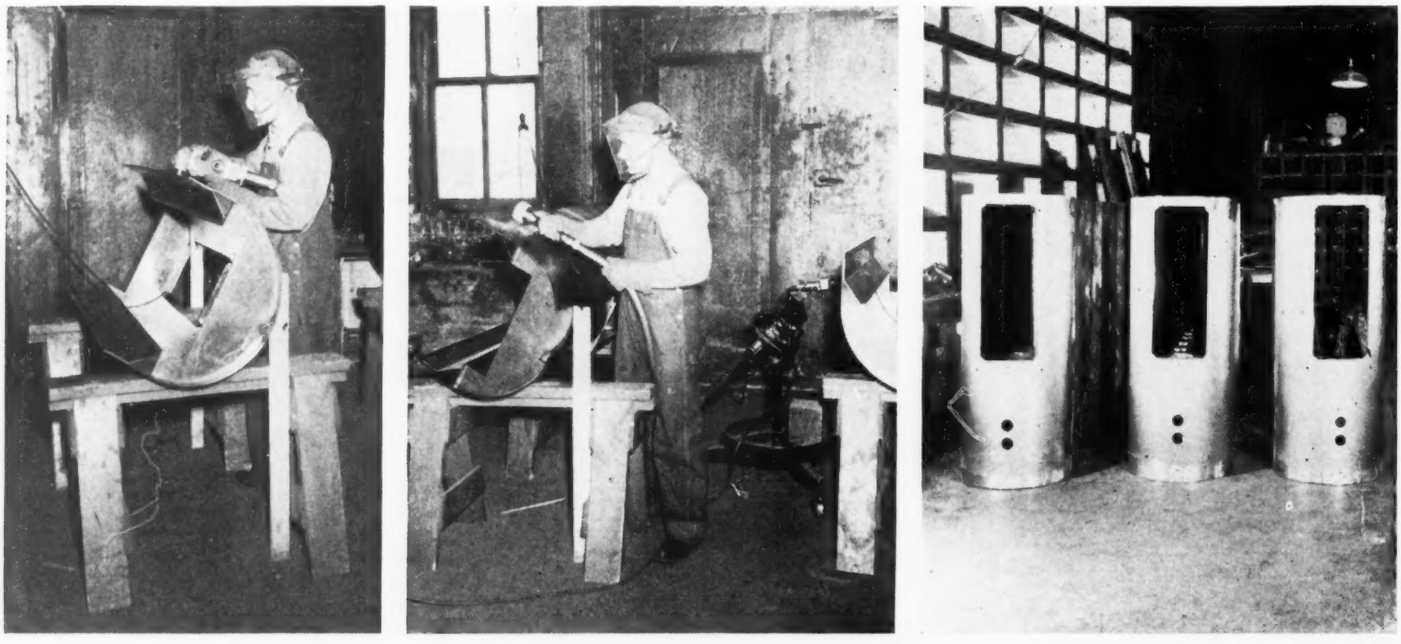
Meanwhile certain interior partitions and shelves have been formed ready for insertion in the shield. These pieces are all spot welded on a welder with a

36-inch throat which allows the rolled shield to pass between the arms from the end. The assembly shows in two photographs. Welding timers are used so that each spot is given uniform pressure, time and heat.

Grinding and Polishing for Painting

After the inside pieces have been spot welded in place, the shield assembly is taken to the grinding department to be smoothed for painting. The first operation consists of knocking all spots back to the outside surface with a blunt end punch and mallet. The soft sheet permits this without loosening the welds. The mechanics have worked out just the right blow to bring the spot a tiny distance beyond the to-be-finished surface.

After knocking out the spots the shield is ready for grinding and polishing. These operations are done with flexible shaft machines as shown in two photographs. When completed, the welds are invisible. This attention to removing any low spots or rough spots has to be followed because the shield is finished in a high gloss, white enamel which shows the slightest imperfection.



From left to right—The inside partitions, ends, etc., have been spot welded inside the shield on a special welder with 36-inch throat. Spot welds have been knocked to the outside with a blunt punch (see text) and the mechanic is grinding down the spots. In center, the final polishing after grinding. After these operations the shield is ready for painting. Right—Several shields as they appear ready for delivery to the customer who does his own enameling.

Stremel's Fire Door Department

Stremel is a very large fabricator of fire doors. One entire department of 8 to 10 men is kept busy the year round making fire doors and tin-clad doors of all types. The wood core is cut, joined and put together on wood-working machines. The tin covering is applied and the doors finished within the one department.

Stremel also fabricates display cabinets and show cases of several types for sales agencies. In most of these only the cabinet is manufactured leaving to others the installing of equipment to heat or cool the case. Another item fabricated in thousands of units is a combustion draft regulator, made in a wide range of sizes, in standard models and in many special sizes. Stremel is tooled to produce the standard sizes in large quantities, but the non-standard sizes are all made without special set-ups.

Earlier Stremel Activities

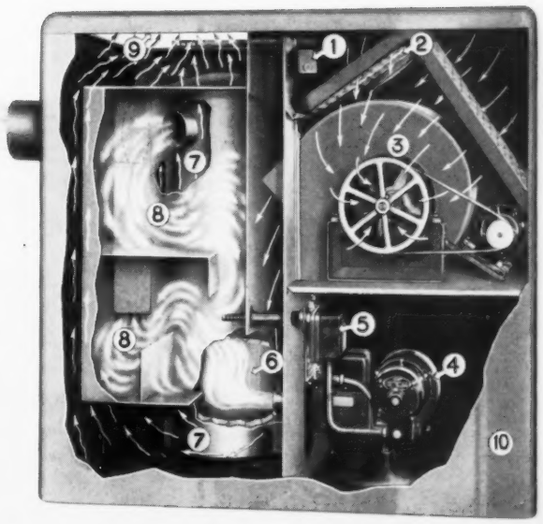
Stremel Bros. Mfg. Co. began many years ago as a hardware store with a small tin shop. Four brothers operated the business; Mr. Richard Stremel manages the retail hardware store, but now W. E. Stremel, son of one of the founding brothers, conducts the manufacturing business. The present, well equipped shop, was established to manufacture hollow metal windows and for many years the firm was the largest fabricator of windows in the central north-west. About 1933 the firm discontinued architectural sheet metal work and began concentrating on the fabrication of sheet metal specialties and fire doors.

Business Keeps Workmen Steadily Employed

Today, architectural sheet metal, ventilation, roofing, heating have no place in the activities of the firm. The specialty fabrication keeps a staff of about 25 men busy practically all year. Every operation, so far as possible, is handled by power equipment and specially developed equipment as described. The tanks have been manufactured for about two years; the shields for over one year. Units, customarily, are put through the shop in 200 to 500 pieces at a time in order to save fabricating cost and to coordinate shop work in keeping with the equipment and operations developed.

More Business FOR PEERLESS DEALERS

IT'S easy to figure out. You can do more business, and make bigger profits, handling PEERLESS Furnaces, Air Conditioners, parts and accessories because: **First:** *Everybody* knows the PEERLESS name and reputation for building the highest quality heating equipment, with 35 years of experience in the field. **Second:** PEERLESS manufactures every type of heating unit from conventional round type furnaces to the most modern fully automatic air conditioners. We furnish *everything,* including duct work, registers, controls, etc. Our stock of current model and "orphan" repair parts is one of the largest in the country. We can nearly always make immediate shipment. **Third:** PEERLESS *prices are generally lower* due to the fact that we manufacture practically everything in our own foundry and plant. Discounts are liberal, and you can depend upon receiving every possible assistance in making sales.



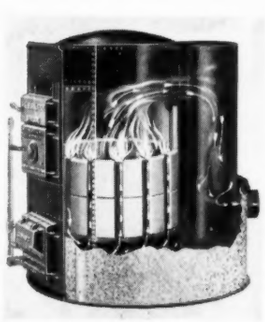
Meet the Demand for AUTOMATIC HEAT...

With the PEERLESS complete line, including *everything* from conventional round cast iron and steel furnaces, to fully automatic winter air conditioners fired with oil, gas or hard fuels, *you shouldn't ever lose a customer.* PEERLESS units are made in such a wide range of models and sizes at such money-saving prices, that you can satisfy every buyer. Modern in every detail of design, construction and finish, they are incomparable in beauty, in compactness, and in operating efficiency. Each unit you sell will result in additional sales and profits for your company. With units like these and the prestige of the PEERLESS name and guarantee behind you, you cannot fail to make more money in 1940 than you've ever made before. Write for literature and dealer proposition.

Shown above in X-Ray view is the amazingly compact and efficient PEERLESS "Master" conditioner for small and medium sized homes. Uses oil or gas. Complete with blower, filters, automatic humidifiers and thermostatic controls. Occupies only 15 square feet.

At Left: New PEERLESS DeLuxe Streamlined Furnace. Incorporates every modern advancement in automatic coal or coke heating. Designed for stoker, but ideal for hand-firing. A great value. Makes a "booster" of every user.

Below: PEERLESS "Sensation" Steel Furnace in beautiful Morocco Green Streamlined cabinet, equipped with stoker and automatic controls. The fastest seller on the market.



NEVER SUCH VALUES IN ROUND FURNACES

Modernized, brought up to the minute in clean-cut appearance and operating efficiency, PEERLESS Cast Iron and Steel Furnaces are still the "bread and butter" sellers of the industry. In fuel-saving economy, in long life of service, and in attractively low prices these PEERLESS furnaces challenge any make or type of furnaces on the market. They create a real sensation, wherever they are shown or installed.

REPAIR PARTS

PEERLESS carries a complete line of repair parts for all makes of "orphan" and current model furnaces in stock at all times for immediate shipment. Made in our own foundry. Prices are exceptionally low.

PEERLESS FOUNDRY COMPANY

INDIANAPOLIS, INDIANA, U. S. A.

THARCO

will stand MORE ABUSE than any furnace cement made

because

Tharco is tough enough to stand up under the withering heat of 2500° boiler fires twenty-four hours every day, day after day. Only an outstanding furnace cement, compounded of superior materials can give such satisfactory heat resistance.

2500°

Photographed at the Delray Power Plant of the Detroit Edison Company, Detroit, Mich.

The fact that Tharco will perform satisfactorily under such unusually severe conditions as shown above, makes it doubly superior for conditions encountered in residential furnaces. You'll find Tharco does everything you've wanted a good furnace cement to do—and does it better.

The Armstrong Company
241 S. Post Ave.
Detroit, Michigan

Date_____

Gentlemen:

Please send me full information on the use and care of furnace cement. Also a sample can of Tharco Asbestos Furnace Cement.

Name_____

Address_____

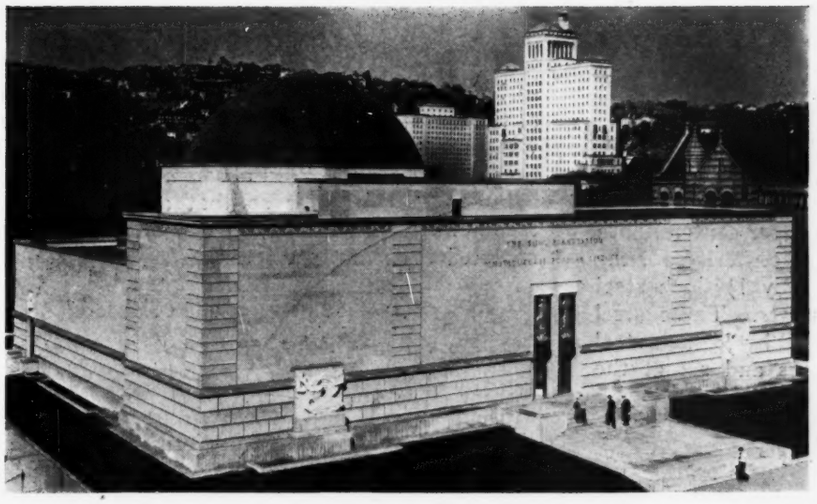
City_____ State_____

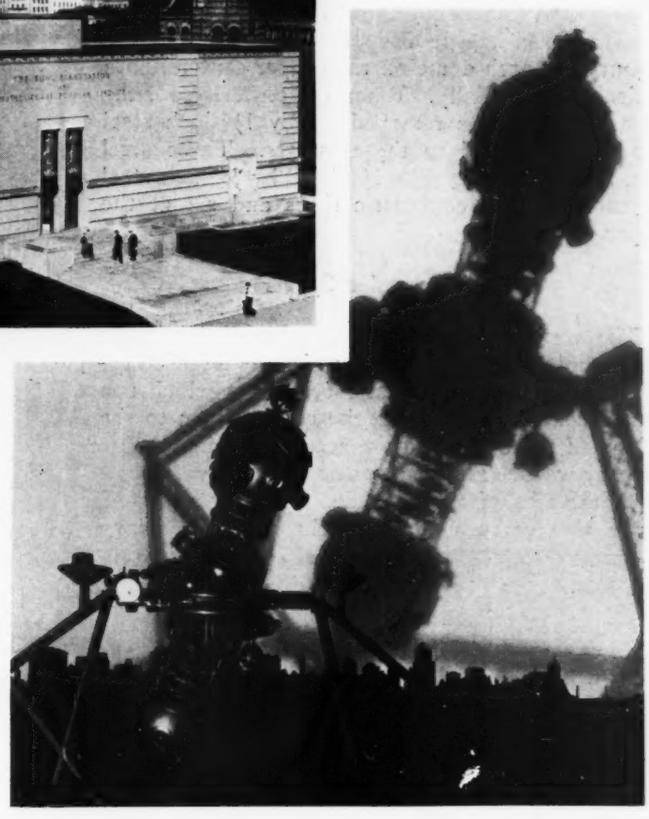
Firm Name_____

FREE!

DATA ON PRACTICAL USE AND CARE OF FURNACE CEMENT. SEND COUPON TODAY!

Armstrong's Caulking Compound makes a permanent seal around duct joints, blower and the furnace base ring. Works easily from any hand pressure gun.





The exterior, copper dome of the Buhl Planetarium was described in the May, 1939, issue. The Zeiss projector silhouetted on the completed projection dome shows the realistic skyline of Pittsburgh.

Construction Details of the Projection Dome of the Buhl Planetarium

IN the May, 1939, issue of American Artisan there appeared a description of the exterior, copper covered dome of the Buhl Planetarium and Institute of Popular Science in Pittsburgh. As in all buildings of this type, there is another dome—the inner dome—equally interesting as a fabrication and erection project. The outside dome protects the building from the weather; the inner dome is a screen on which a complicated and wonderful machine projects the heavens. It is possible, with this machine, to show the heavens as they are today, were yesterday, five thousand years ago or will be five thousand years hence.

Fabricating and Erecting Problems

This inner dome is constructed of stainless steel sheets, as the photographs show. The contour of the dome is such that in addition to the problem of fabricating and suspending the many sheets which make up the dome there is also the problem of acoustics and the problem of light projection on certain areas. These problems and their solution will be discussed later in the article.

The contract for the installation of this dome was awarded to Johns-Manville Sales Corp., New York City. Work in connection with the dome was handled by the company's Pittsburgh office.

General Dome Design

The technical description of the dome, its fabrication and construction as explained by officials of the company follows:

"The dome consists of a 65-foot diameter hemispherical steel dome—a true hemisphere of 32 foot-6 inch radius. The springline of the dome is 9 feet 10 inches above the floor level. There is a 10-inch vertical skirt below the springline. The profile of the city of Pittsburgh is cut through the springline and extends above and below, depending upon the contour. One of the photographs shows this sky-line clearly. The method of obtaining the sky-line will be explained later.

"The material forming the dome is 20-gauge, 18-8 chrome nickel stainless steel. The steel was formed at the fabrication plant of the Edward G. Budd Mfg. Co., Philadelphia, in spherical, curved sections with stiffening angles welded around the edge of each sheet and at proper intervals between. The steel is perforated with holes .085 inches in diameter, approximately 25 holes per square inch for acoustical

reasons. The perforating was included in the Budd Company's portion of the work.

"The masonry dome forming the roof of the building is a tile arch dome about 70 feet in diameter. Standard steel toggle inserts were placed in the masonry tile arch dome on the proper centers, both vertically and radially. When the centering for the tile arch dome was removed, ¼ by 1½-inch steel flats were fastened to these inserts. These steel flats, in turn, support the 1½ by 2 by ¼-inch steel angles formed in concentric rings and set at the proper elevations.

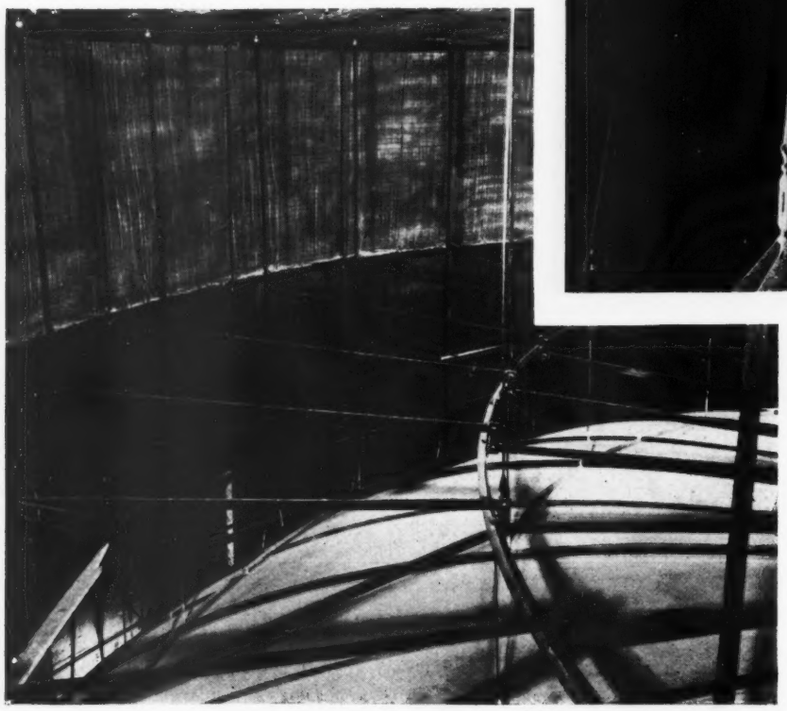
Steel Suspension System

"The vertical steel straps were then tied together horizontally between each row of rings and tied together radially with similar steel straps which run from a concentric angle in the center down to the bottom of the dome and are secured to the outside masonry walls. These, in appearance, are very similar to the ribs of an umbrella. The vertical steel straps also carry light steel channels and heavy square wire mesh for the support of the sound absorbing blanket which extends over the entire back of the dome and also down the side of the masonry walls to a point below the light baffles. The furring, blankets and sound absorbing material are all painted dark in color so that any light filtering through the small holes in the dome will not be reflected back into the room.

Method of Suspending Sheets

"The rigid furring system, described above was located so that the annular rings were about 3 feet above the stainless steel projection dome. Below this the wooden centering forms were built on which the stainless steel sheets were laid. The sheets were bolted together at the edges through the reinforcing angles. The sheets were then suspended from the annular rings above by means of 3/16 by 1-inch stainless steel straps, each strap containing a turnbuckle (see photograph) for adjustment. When the dome was entirely assembled the centering was removed and the dome finish painted from below in two coats of special light reflecting white lacquer.

"The dome as actually fabricated consists of a



Right—Photograph taken half way down the dome (behind) shows the flat steel straps and turnbuckles which support the dome. The angles and stiffeners were riveted to the sheets. The angles were then bolted together and the segment trued up with the turnbuckles. Below—The suspension system. The vertical flat bars hang from anchors in the tile, exterior dome. The straps support the 7 horizontal concentric. rings. Each concentric ring is one step below the ring immediately inside so that the turnbuckle bars (above) are all approximately the same length. The entire dome is free to swing on the straps. Note sound absorbing blanket lining the wall.

Above—Center concentric (highest of the seven) ring and the radial bars which join rings. Also bars and turnbuckles supporting sheets. Note thousands of small holes which let sound through the sheets of the dome. View also shows formation of a typical sheet. Below—The Skyline was photographed, then an enlarged drawing was made for a pattern. The lower row of sheets was silhouetted as shown. The workmen are erecting the light baffles which throw light down and out of sight as light from the machine reaches the skline. (See text.)

circular piece approximately 5 feet in diameter at the top. There are three concentric rows of sheets below this point. In the first row there are 16 sheets; in the second and third rows 32 sheets each. The lowest row of sheets has the profile of the Pittsburgh skyline cut out of the lower edge as the photographs show. The sheets are so large that it was necessary to reinforce the sheets with stiffening angles of stainless steel, welded in the form of a cross on the back of each sheet.

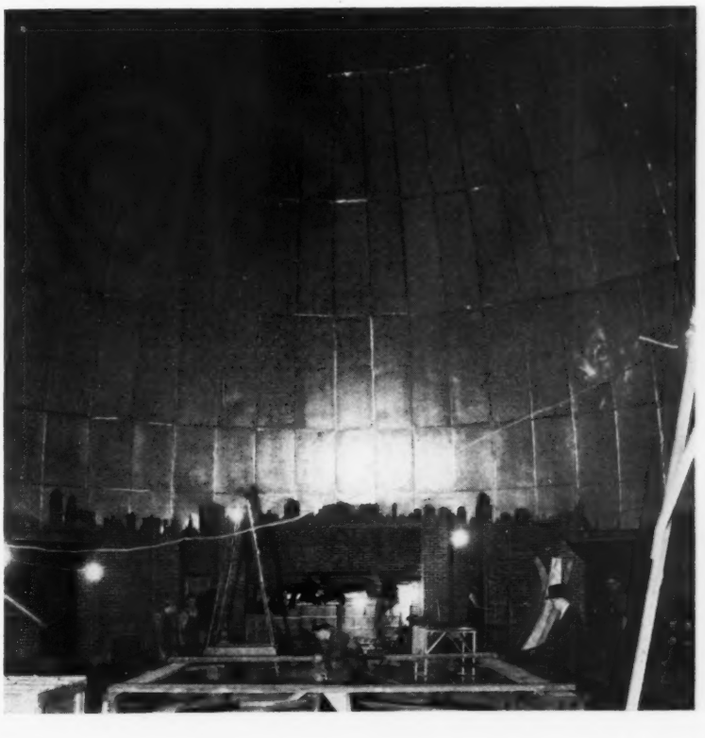
Skyline Formation

"The skyline silhouette was made from a series of panorama photographs taken of the skyline by the planetarium authorities. The pictures were pasted together and from these, in 1 inch equals 1 foot scale, a drawing of the silhouette was made as it appears. The drawing was then enlarged to full size and used as a template for cutting the silhouette. The silhouette was cut in the shop when the sheets were formed, serially numbered for installation.

"Structurally, the dome is free to swing, contract, expand and move in nearly any direction without undue strain or twist in any part. Actually, once the dome is finished and housed in the air conditioned room there will be very little movement.

Some Acoustical Problems

"The acoustical problem and the projection problem are, of course, the reason for constructing the dome in this manner. A circular room, with a domed ceiling, is just about as poor an acoustical design as it is possible to make. Also, the curved surfaces of the wainscot, doors, baffles, as well as the dome, can all cause a distinct concentration of sound with resulting annoying echoes and lack of clarity in hearing. The large amount of sound ab-



sorbing material used creates the desired quieting effect. By perforating the sheets and allowing the sound waves to go through, it is possible to load the space in back of the dome with high efficiency sound absorbing material. The result is an "acoustical mirage." The same sound effect is obtained as a person gets sitting out under the open sky.

Light Projection Problems

"In the operation of the Zeiss machine, when the light is projected a distance of over 30 feet, it is impossible to cut off the light at a definite point. In other words, light projected through a pin hole will widen several inches up and down from the proposed cut off line. Further, the silhouette varies from 10 inches below to 20 inches above the springline. The result is that when a star, traveling, strikes a building at the horizon it should disappear. To accomplish this the entire circular wall behind the dome is finished with a series of baffles slanting out at an angle of 45 degrees. Light coming through the silhouette strikes the sloping baffle and is turned downward and trapped before it can return into the room. (See photograph.)

"These baffles are supported from special steel brackets, secured to the masonry and are faced with sound absorbing material and covered with perforated steel, the perforations being similar to those of the dome. The baffles are made from 20-gauge hot rolled, mild carbon steel. Incidentally, the facing of all doors, wainscoting below the baffles are also of perforated, mild carbon steel backed with sound absorbing material. Where it was not possible to use large baffles, the trim work and door facing are finished with small baffles approximately 1½ inches long and sloped 45 degrees.

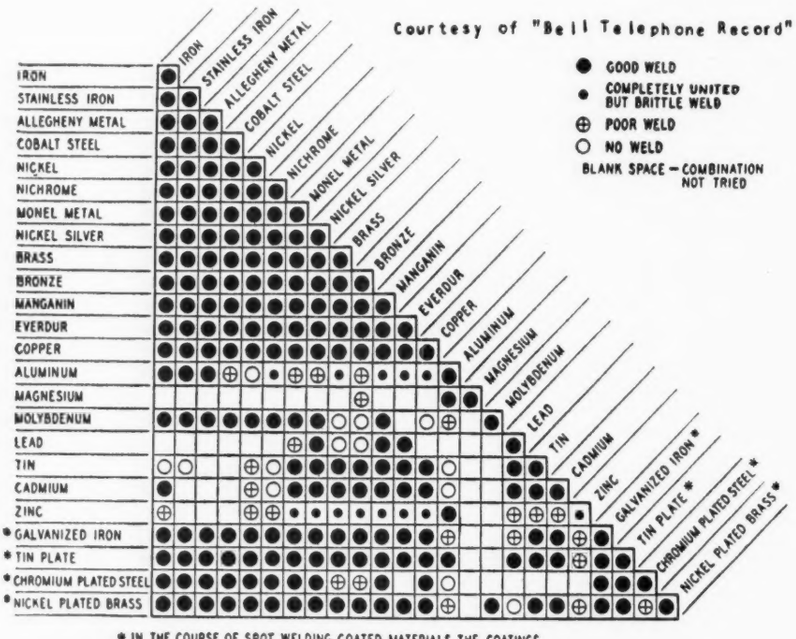
"The erection of the dome, the necessary steel supports, the sound absorbing material, the baffles, wainscoting, door fascias and the metal trim work on the interior of the Planetarium Room were all done by the Johns-Manville Sales Corp."

Metals Which Can Be Spot Welded

FREQUENTLY the question arises—"Can I spot weld this material to that material?" A ready reference chart showing materials which weld strongly together and materials which do not weld or which weld unsatisfactorily is published below. This chart originally appeared in a published series on resistance welding.

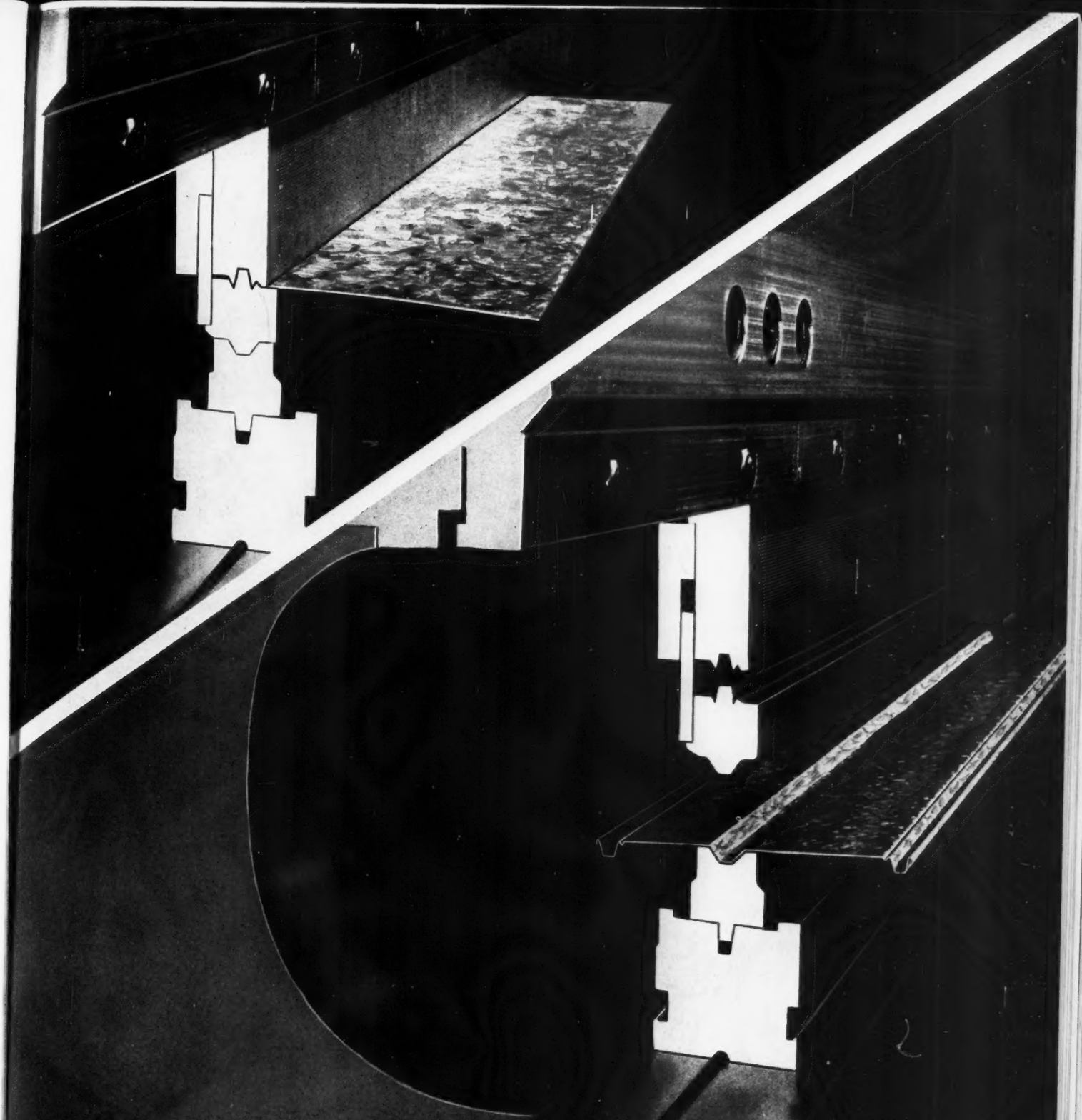
The value of the chart lies in its arrangement whereby practically any combination of materials commonly used in the sheet metal shop can be paired to see whether or not the weld will be satisfactory.

It is suggested that any combination not shown be submitted to a welding authority as the chart is intended to cover all commonly used sheet material.



* IN THE COURSE OF SPOT WELDING COATED MATERIALS, THE COATINGS FREQUENTLY DISSOLVE IN THE OTHER METALS PRESENT OR BURN AWAY

CHARACTERISTICS of spot welding of some 250 combinations of metals. This study was made by Lawrence Furguson of the Bell Telephone Laboratories, Inc. As in spot welding of steel, an essential detail is the choice of a suitable electrode tip. For welding high resistance materials such as iron, nickel, nichrome, and nickel-silver, electrode tips of copper are suitable. Where greater strength or longer life is required, however, a copper rich copper-tungsten alloy is advisable. For low resistance materials such as copper or aluminum, tungsten tips are the best as they do not easily alloy or weld at ordinary welding temperatures.



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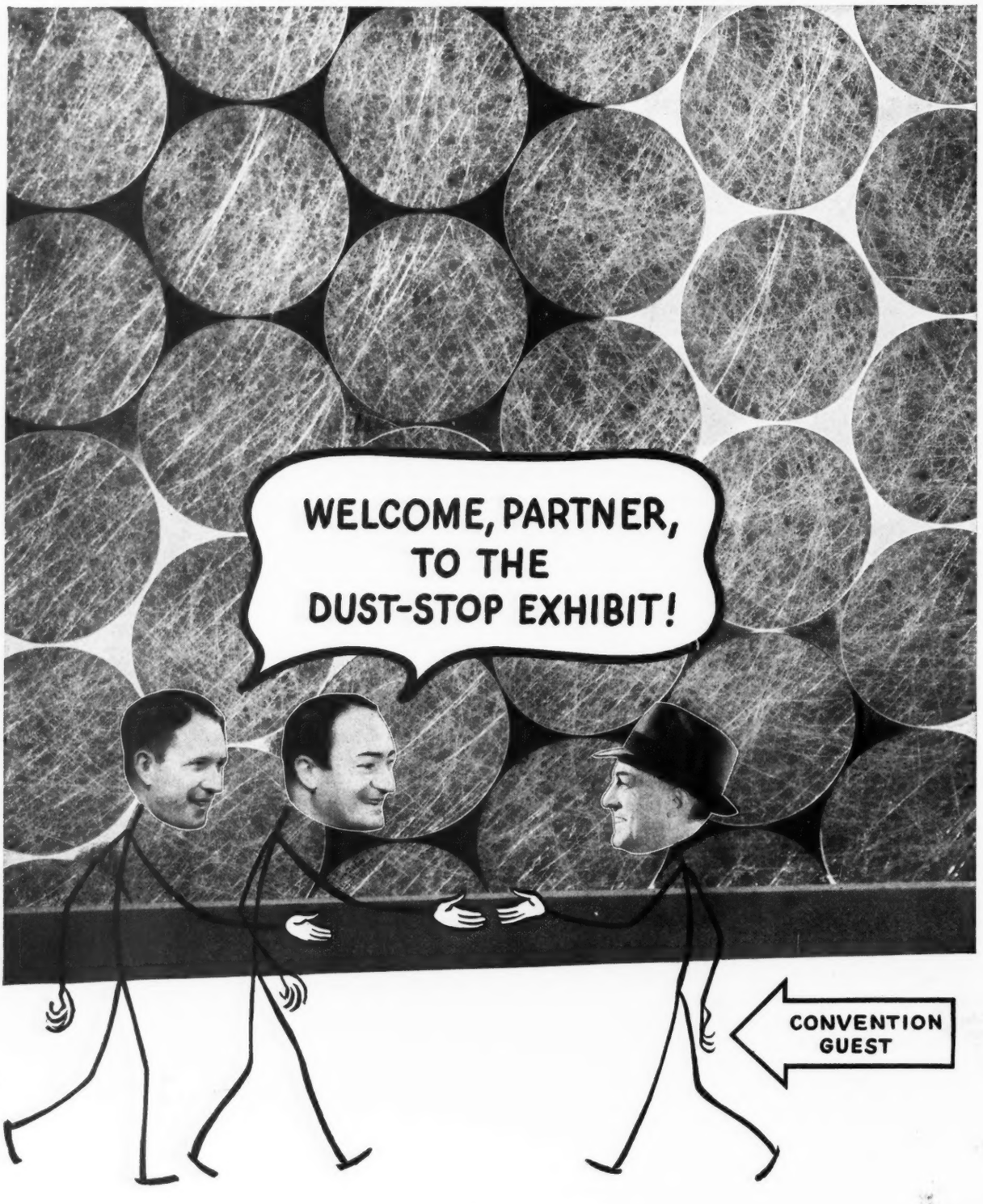

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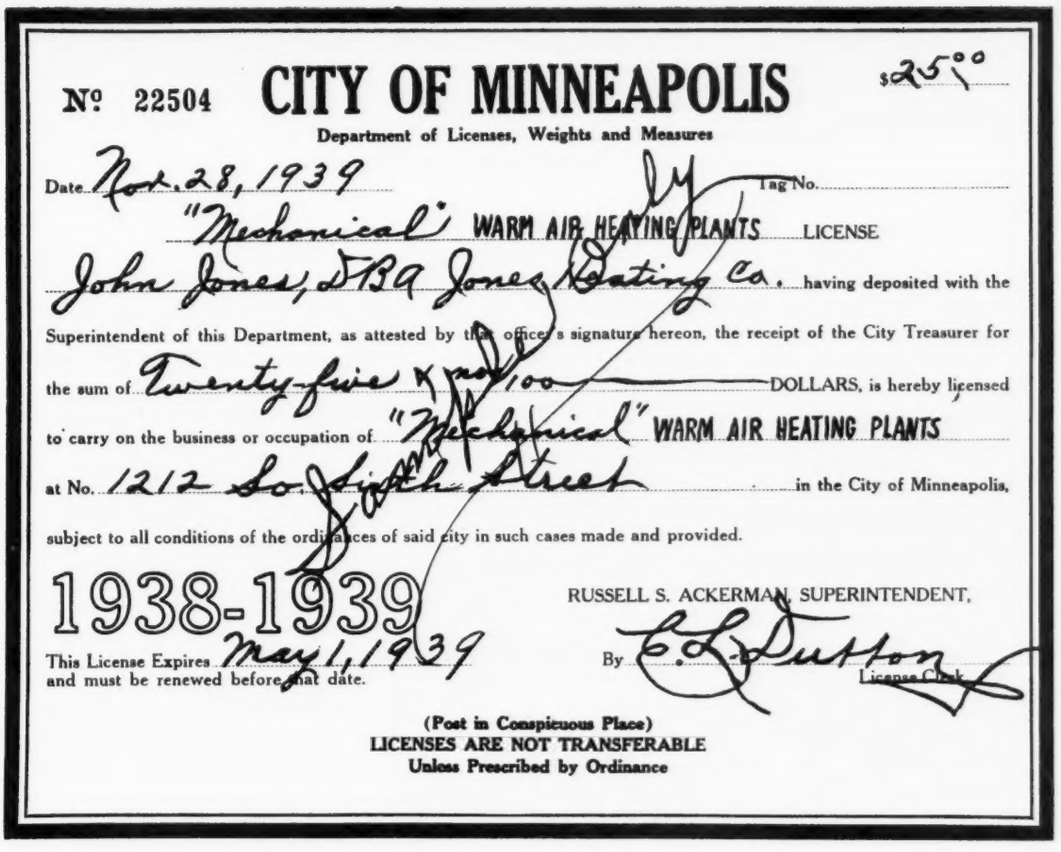
*T. M. REG. U. S. PAT. OFF.

Made by Owens-Corning Fiberglas Corporation, Toledo, Ohio



No. 22504 **CITY OF MINNEAPOLIS** $25.00

Department of Licenses, Weights and Measures

Date Nov. 28, 1939 Tag No.

"Mechanical" WARM AIR HEATING PLANTS LICENSE

John Jones, DBA Jones Heating Co. having deposited with the Superintendent of this Department, as attested by this office's signature hereon, the receipt of the City Treasurer for the sum of Twenty-five & no/100 DOLLARS, is hereby licensed to carry on the business or occupation of "Mechanical" WARM AIR HEATING PLANTS at No. 1212 So. Fifth Street in the City of Minneapolis, subject to all conditions of the ordinances of said city in such cases made and provided.

1938-1939

This License Expires May 1, 1939 and must be renewed before that date.

RUSSELL S. ACKERMAN, SUPERINTENDENT,

By E. L. Dutton License Clerk

(Post in Conspicuous Place)
LICENSES ARE NOT TRANSFERABLE
Unless Prescribed by Ordinance

A Resume of Minneapolis Heating Practice Under the Licensing and Permit Ordinance

By Howard Betts

Senior Heating Engineer, Department of Buildings

MINNEAPOLIS, Minnesota, according to the Real Property Inventory published in 1935, had 54,157 single family dwellings, of which 31,248 (58 per cent) were warm air heated; 22,004 (40 per cent) were hot water heated; 905 (2 per cent) were steam or vapor heated. Since that time, or in 1936, 1937, 1938 and the first seven months of 1939 there have been built in Minneapolis 4,508 new homes of which 3,348 (74 per cent) are heated by warm air; 964 (21 per cent) are heated by hot water; 196 (5 per cent) are heated by steam or vapor systems. In this same period 2,946 old homes have had their heating systems replaced, of which 1,678 (57 per cent) are heated by warm air; 996 (34 per cent) are heated by hot water; 272 (9 per cent) are heated by steam or vapor.

These changes in the choice of a heating plant, whether for a new house or as a replacement, have taken place since Minneapolis adopted its present city ordinance requiring the licensing of all firms installing heating systems or heating devices and requiring a permit for the installation of a heating system or a heating device.

As a result of publicity given the Minneapolis ordinance, the Department of Buildings has answered numerous letters from individual contractors and from contractor groups interested in similar ordinances for their communities. These letters indicate that contractors interested in an installation ordinance are most concerned with a few basic questions. This summary of Minneapolis heating practice under our ordinance is an attempt to answer these basic questions.

The questions for which answers will here be attempted are as follows:

1. Has the ordinance reduced the number of contractors doing each type of heating work?
2. Has there been any noticeable increase in the profits made by contractors for each type of heating system?
3. Has the ordinance caused a definite betterment in the installation practices followed?
4. Has the ordinance tended to reduce the number of "fly-by-nights" and "irresponsible" contractor operating in Minneapolis?
5. Are Minneapolis contractors satisfied with the

results obtained under the ordinance? If there is dissension, what is its source and what is the cause of complaint?

6. Has the ordinance stabilized prices; does cut-price still prevail; have prices for specified types of heating systems increased or decreased?

7. What is the general routine followed in obtaining a permit and a license under the ordinance?

To answer these questions intelligently, it is necessary to start at the beginning of ordinance history in Minneapolis. Changes, oftentimes radical, have been made in our law and in our routine, so to understand fully what we have experienced we should go back to the first ordinance adopted in the city.

In the Spring of 1926 the city of Minneapolis adopted its first heating ordinance. The code covered only installation of gravity furnaces and was pretty much like the Standard Code of the National Warm Air Heating and Air Conditioning Association. Contractors were not licensed; anyone in business or a layman could install—but a permit had to be taken out for each job. After each job was completed the installation was inspected by an inspector from the general building department staff who, even though conscientious, knew little about heating. This first ordinance accomplished two things—it eliminated some of the obviously fire-hazardous installations and it did away with the furnace which was definitely under-sized.

During that first year permits were taken out by 95 separate heating firms or individuals.

In May, 1927 the code was amended to require a license for anyone who desired to install a fur-

Heating Permits by Types

KIND OF HEATING SYSTEM	1936	1937	1938	1st Seven Months 1939
Gravity Warm Air:				
1. New Homes				
Number and Per Cent of Total	377....18%	412....19%	598....28%	311....28%
Value and Per Cent of Total	$ 87,997.... 9%	$104,835....10%	$180,710....17%	$ 95,830....15%
2. Replacements				
Number and Per Cent of Total	562....28%	447....21%	320....15%	132....12%
Value and Per Cent of Total	$143,760....15%	$128,285....13%	$ 93,550.... 9%	$ 40,620.... 6%
3. Total Gravity				
Number and Per Cent of Total	939....46%	859....40%	918....43%	443....40%
Value and Per Cent of Total	$231,757....24%	$233,120....23%	$247,260....26%	$136,450....21%
Forced Air:				
1. New Homes				
Number and Per Cent of Total	279....14%	368....18%	580....27%	423....39%
Value and Per Cent of Total	$198,855....21%	$259,175....26%	$379,715....35%	$250,640....40%
2. Replacements				
Number and Per Cent of Total	. 46.... 2%	66.... 3%	73.... 3%	32.... 3%
Value and Per Cent of Total	$ 26,540.... 3%	$ 39,410.... 4%	$ 41,205.... 4%	$ 18,925.... 3%
3. Total Forced Air				
Number and Per Cent of Total	325....16%	434....21%	653....30%	455....42%
Value and Per Cent of Total	$225,395....24%	$298,585....30%	$420,920....39%	$269,565....43%
Total All Warm Air:				
Number and Per Cent of Total	1,264....62%	1,293....61%	1,571....73%	898....82%
Value and Per Cent of Total	$457,152....48%	$531,705....53%	$695,180....65%	$406,015....64%
Steam or Vapor:				
1. New Homes				
Number and Per Cent of Total	61.... 3%	63.... 3%	45.... 2%	27.... 2%
Value and Per Cent of Total	$193,395....20%	$111,560....11%	$107,805....10%	$118,235....19%
2. Replacements				
Number and Per Cent of Total	78.... 4%	91.... 4%	86.... 4%	17.... 2%
Value and Per Cent of Total	$ 53,985.... 6%	$ 66,155.... 7%	$ 66,400.... 6%	$ 17,030.... 2%
3. Total Steam or Vapor				
Number and Per Cent of Total	139.... 7%	154.... 7%	131.... 6%	44.... 4%
Value and Per Cent of Total	$247,380....26%	$177,715....18%	$174,205....16%	$135,265....21%
Hot Water:				
1. New Homes				
Number and Per Cent of Total	353....17%	338....16%	185.... 8%	88.... 8%
Value and Per Cent of Total	$162,600....17%	$173,670....17%	$123,155....11%	$ 69,555....12%
2. Replacements				
Number and Per Cent of Total	296....14%	349....16%	290....13%	61.... 6%
Value and Per Cent of Total	$ 89,294.... 9%	$115,605....12%	$ 81,820.... 8%	$ 18,160.... 3%
3. Total Hot Water				
Number and Per Cent of Total	649....31%	687....32%	475....21%	149....14%
Value and Per Cent of Total	$251,894....26%	$289,275....29%	$204,975....19%	$ 87,715....15%
Total All Radiator Heat:				
Number and Per Cent of Total	788....38%	841....39%	606....27%	193....18%
Value and Per Cent of Total	$499,274....52%	$466,990....47%	$379,180....35%	$222,980....36%
Total All Heating Jobs:				
Number and Per Cent of Total	2,052...100%	2,134...100%	2,177...100%	1,091...100%
Value and Per Cent of Total	$956,426...100%	$998,695...100%	$1,074,360...100%	$628,995...100%

nace. The installing code remained as an ordinance covering gravity furnaces only and anyone in business could secure the license (without examination) upon application and payment of the fee of $50. (There were few stokers being sold, but quite a number of oil burners, so an oil burner required a permit and inspection by the Fire Prevention Bureau). Between May, 1927 and May, 1928, 48 firms took out a license. A decided reduction in the number of firms operating was made the first year.

Licensing and the installation code remained pretty much this way until 1935, when the ordinance was revised to include separate licenses and regulations for each of the following:

Gravity warm air heating; mechanical warm air heating; steam and hot water heating; oil burners; gas burners; stokers. Permits were required thereafter for each of the above mentioned installations.

Contractors Increased or Decreased

As stated previously, under the first gravity code (without licensing) from May 1926 to May 1927, permits were taken out by 95 separate parties. We assume, then, that there were at least 95 warm air heating contractors or individuals in Minneapolis. By years, the following tabulation is taken from the department's records:

Gravity License Only

May, 1927 to May, 1928—48 firms took out a license
May, 1928 to May, 1929—33 firms took out a license
For the year 1929 —28 firms took out a license
For the year 1930 —28 firms took out a license
For the year 1931 —26 firms took out a license
For the year 1932 —20 firms took out a license
For the year 1933 —18 firms took out a license
For the year 1934 —23 firms took out a license
For the year 1935 —30 firms took out a license

In 1935, as stated, the ordinance was amended to require a separate license for gravity furnace, mechanical furnace, steam or hot water heating. By years these licenses taken out were:

APPLICATION FOR MECHANICAL WARM AIR HEATING PERMIT

No. P 7631

Date of issuance Oct. 2, 1939 Location of Plant 1492 Columbus St.

Minneapolis, Minn. Oct. 2, 1939

John E. Nelson
~~Louis Glassing~~, Inspector of Buildings:

The undersigned hereby makes application for a permit for the installation, alteration or repair of a heating, air conditioning or ventilating system, device or equipment, as herein specified, agreeing to do all such work in strict accordance with the City Ordinances and rulings of the Department of Buildings and the specifications set forth in this application as approved and filed in the Department of Buildings.

Owner James Doyle Address of Owner 4675 Plymouth
Kind of Building Frame How Occupied Dwlg
Work to be commenced Oct. 2 1939 to be completed Nov. 24 1939
Estimated Cost $ 525.00 ~~Old~~—New Building Permit No. B436258 Electrical Permit No.

DESCRIPTION OF WORK

Note: Insert the word, install, add, alter or repair, according to which is to be done. Under "Remarks," itemize removals, if any, and alterations to equipment.

Install 1 Mechanical Warm Air Heating Plants—~~Furnaces~~
Make Allheat Size 120 G
Connected load 59,678 Btu Capacity 69,200 Btu
Air Conditioning System: Summer—Winter—All Year;
Make Capacity Cfm
Ventilating System: Make Capacity Cfm
Remarks:

Signed Hennepin Heating Co
By Samuel Smith

Approved Nov. 28, 1939 Address
J. C. Davidson Inspector Telephone

Year	Gravity Licenses	Mechanical W. A. Licenses	Steam or Hot Water Licenses
1936	61	58	178
1937	51	53	176
1938	47	53	171

The year by year figures above, of course, show Minneapolis through the worst years of the building industry. We feel, nevertheless, that the code kept out some firms which otherwise would have been in competition.

In this connection it is only fair to point out that the code applies only to the city of Minneap-

DUPLICATE **MECHANICAL WARM AIR HEATING, VENTILATING OR AIR CONDITIONING PERMIT**

DESCRIPTION OF WORK

No. of Mechanical Warm Air Heating Plants—Furnaces—to be installed—~~altered~~—~~repaired~~ 1,
Make Allheat, Size 120 G;
Air Conditioning System: Summer—Winter—All Year,
Make, Capacity, Cfm.;
Ventilating System: Make
Capacity, Cfm.
Remarks:

No. P. 7631
Minneapolis, Minn. Oct 2 1939
Owner James Doyle
Location 1492 Columbus St.
Kind of Building Frame
How Occupied Dwlg
Work to be Commenced Oct 2 1939
To be Completed Nov 24 1939
Estimated Cost, $ 525 00
~~Old~~—New, Building Permit No. B436258

Permission is hereby granted to Samuel Smith to install-erect-use the material and devices described in the above statement. This permit is granted upon the express condition that the person to whom it is granted, and his agents, employes and workmen, in all the work done and materials used under this permit, and in the operation of the devices herein mentioned shall conform in all respects to the ordinances of the City of Minneapolis relating to or governing the work to be done and the operation of the devices herein named, and to the specifications set forth in the approved application for this permit on file in the office of the Inspector of Buildings.

John E. Nelson Inspector of Buildings.

AGREEMENT AND SWORN STATEMENT.

In consideration of the issue and delivery to me by the Inspector of Buildings of the City of Minneapolis of the above permit, I hereby agree to do the proposed work in accordance with the description above set forth and according to the provisions of the ordinances of the City of Minneapolis, and, being first duly sworn, I hereby state and say that the facts stated by me and contained in the above permit are true as therein stated.

Samuel Smith

Subscribed and sworn to before me at Minneapolis, Minnesota, this 2 *day of* Oct *A. D.* 1939

My commission expires 193

Notary Public, Hennepin County, Minn.

A-27 1938

Reproduced with this article are several typical forms which the Building Department issues as a job progresses. Above is an application form for a mechanical warm air system. The contractor submits this application and when approved the permit shown at the left is issued by the Building Department. All forms are made in several copies.

APPLICATION FOR HEATING OR POWER PLANT AND SPECIAL DEVICE PERMIT

No. G 29367

Date of issuance Oct. 13, 1939 Location of Plant 4892 Oscela St

John E. Nelson Minneapolis, Minn., Oct. 10, 1939

~~Louis Chomsky~~, Inspector of Building:

The undersigned hereby makes application for a permit for the installation, alteration, repair or operation of a heating or power plant, device or boiler, as herein specified, agreeing to do all such work, or to operate such plant or boiler, in strict accordance with the City Ordinances and rulings of the Department of Buildings and the specifications set forth in this application as approved and filed in the Department of Buildings.

Owner James Kelly Address of Owner Same

Kind of Building Brick Veneer How occupied Dwlg.

Work to be commenced Oct. 16, 1939 to be completed Oct. 24, 1939

Estimated Cost $460.00 Old—New Building Permit No. B-62639 Electrical Permit No.

DESCRIPTION OF WORK

Heating or Power Plants: ~~Steam~~—Hot Water—~~Warm air~~, how many One

Trade name Everlast Size No. 6-21

Manufacturer Everlast Boiler Co. Address Pittsburgh, Pa.

Description:

Capacity Sq. Ins. L. P. A. 625 Sq. Ft. ~~S. P. R.~~ Con. Btu. H. P.

Total connected load 560 Kind of fuel Oil

Smoke preventing devices

Ventilating or Air Conditioning System: Summer—Winter—All year

Make Description

Stoker: Trade name Size No.

Type Feed rate lbs. hr., Fuel

Boiler or furnace Grate area Sq. Ft.

Setting

Other Devices: Device Size No.

Capacity Used for

Remarks:

Chimney or Stack: Height from Grate Level ft., Inside Dimensions inches, Style, Square—Round. (These must be accurate.) No. of Boilers or Furnaces now in use

Remarks:

Approved Nov. 1, 1939

Wm. Callahan Inspector.

Signed Minneapolis Heating Co. Licensee.

By Arthur James

Address

Telephone

D-16 1935

Above and right are other typical applications—one for large heating, ventilating or air conditioning systems, the other for gravity warm air. Note the information required.

◆

olis—not to Minneapolis suburbs and not to the adjoining city of St. Paul, and, I might add, that at least one of the larger Minneapolis suburbs is at this writing seriously considering the adoption of the Minneapolis Heating Code in its entirety to assure protection of its residents.

Here, in answer to the question—"Did the code keep 'fly-by-nights', 'out-of-work tinners' or 'gyps' out of Minneapolis?" we can truthfully answer—yes. But the code has had no direct effect on Minneapolis suburbs. The code has, however, had an indirect effect on installations in Minneapolis suburbs in this manner. Generally speaking, speculative builders, home loan agencies, architects and builders have, during the last three years, appreciated that installations under our code are better designed and installed than non-code installations, so we find, today, that many of these agencies specify that the heating plant "shall be installed according to the Minneapolis code" and even though our department cannot render inspection service we do feel that such installations are better than they would be if the builders completly ignored the code regulations.

Better Installations

A frequent question is—"Has the code caused a noticeable improvement in design and installation practice?" Perhaps the best answer is to be found in a brief resume of the steps a job goes through before completion and what the contractor must know to hold a license.

As stated, under the original gravity code any man in business was permitted to take out a license without examination. But any man starting in business since must take a written examination which is not intended to demand a college education, but is designed to show whether the man knows the fundamentals of warm air heating.

The "Certificate of Competency," entitling a man to a license, is held by an individual—not by a firm. Every heating plant application submitted by the firm for permit must bear the signature of the holder of the certificate or his authorized representative and he is held responsible for the installation. Each year this certificate of competency and license must be renewed and it is at renewal time that those with numerous minor offenses to their discredit are "put on the carpet." City charter provisions are such that a licensee automatically loses his license upon conviction by a court of a second offense during a license year.

For example, if there is any complaint on a job, that complaint is filed with the department. The contractor is notified of the complaint and is told to fix it. Mostly the complaints come from the inspectors but sometimes from the owner. The con-

APPLICATION FOR GRAVITY WARM AIR HEATING PERMIT

No. Q 938

Date of issuance Oct. 30, 1939 Location of Plant 2346 Ramsey St

John E. Nelson Minneapolis, Minn. Oct. 30, 1939

~~Louis Chomsky~~, Inspector of Buildings:

The undersigned hereby makes application for a permit for the installation, alteration or repair of a heating plant, device or equipment, as herein specified, agreeing to do all such work in strict accordance with the City Ordinances and rulings of the Department of Buildings and the specifications set forth in this application as approved and filed in the Department of Buildings.

Owner John Collins Address of Owner Same

Kind of Building Frame How occupied Dwlg.

Work to be commenced Nov. 1, 1939 to be completed Nov. 10, 1939

Estimated Cost $365.00 Old—New Building Permit No.

DESCRIPTION OF WORK

Note: Insert the word, install, add, alter or repair, according to which is to be done. Under "Remarks," itemize removals, if any, and alterations to equipment.

Install 1 Gravity Warm Air Heating Plants—~~Furnaces~~

Make Minneapolis Size No. 24-48

Connected load 490" Capacity 526"

Remarks:

Signed Nicollet Heating Co.

By Neil Nelson

Approved Nov. 28, 1939

A. F. Hovda Inspector.

Address 1496 Nicollet Ave

Telephone

D-41 1938

tractor is told to remedy the error; when he does so he reports to the department and the inspector again visits the job to O.K. or reject.

When license renewal time comes if any complaints are standing against the contractor his license is not granted until every complaint is cleaned up. Incidentally, on all kinds of work inspected, about 20 per cent of the jobs have complaints. These mostly are of a minor nature (metal screws in smoke pipe, a pipe one size too small, etc.) and are readily and quickly rectified.

The main point is that so long as the contractors realize that the smallest detail is examined—that the code means exactly what it says and no less—jobs are up to standard and, we feel, are better than before the code or better than they would be without a code.

It has been our experience that the code has established a *minimum* set of specifications. Most contractors design and install to meet these minimum specifications and no more. The owner gets what the code calls for and no more. Therefore, we recommend, from our experience, that any code should be complete and leave nothing to argument. The stricter the code the better the jobs. Our experience leads us to believe that the *average* contractor gives only what he absolutely has to.

The Price Situation

Frequently we have been asked if the code has raised prices or stabilized prices or removed the chiselers. That is a difficult question to answer. We can see from our records that in 1936 a popular type of mechanical warm air heating system was installed for about $625. Today that same system, perhaps better installed, can be bought for $100 less or about $500 to $525. Part of this is due to decreased prices of some equipment; some is due to better management; some is due to contractors' willingness to take less profit.

We do know that prices in Minneapolis are fairly stable and that changes in price today are gradual over several years. In St. Paul, we are told, where there is no code, prices have dropped lower than prices in Minneapolis and installations, generally, are not so good. We feel that if our code was suddenly killed, prices would begin to skid and installations would depreciate in quality.

In this connection, it is interesting to note, that in Minneapolis we now have only a half dozen or so "one man shops"—in other words, contractors seem to have discovered that they can make more money and more profits if they stop working with the tools and devote their entire time to sales and management. Practically all shops employ union

(*Continued on page* 184)

D-56 1939

HEAT LOSS CALCULATIONS — DEPARTMENT OF BUILDINGS — MINNEAPOLIS, MINN.

Weatherstrips Windows (Yes/No)	Weatherstrips Doors (Yes/No)	A.S.H.V.E. Guide Reference 19[illegible]	Construction No. Out. Wall	Int. Wall	Ceiling	Roof	Floor	Insulation Kind	Insulation How Applied
Yes / ~~No~~	Yes / ~~No~~		6S-I	—	9-B	6A	I-D	4" Rock Wool	Wall + Ceiling

1 Fl. Living Room | Length 16'-6" | Width 11'-6" | Height 8'-3"

Windows and Doors—Crackage and Area

No.	Width of pane	Height of pane	No. of lights	Lineal ft. of crack	Area sq. ft.	
1	3'	6'-8"	Door	19.3	20.0	151 Cfm
2	30"	30"	2	58.5	46.8	

		Coef.	Btu
Infiltration	77.8	38	2956
Glass	66.8	50	3340
Exp. wall	278		
Net exp. wall	211	6.5	1372
Int. wall			
Ceil.	213	5.6	1193
~~Cellar~~ floor	213	7	1491
Total Btu.			10352

Required sq. ft. E.D.R. or sq. ins. W.A. Leader area

1 Fl. Kitchen Room | Length 12'-0" | Width 7'-6" | Height 8'-3"

Windows and Doors—Crackage and Area

No.	Width of pane	Height of pane	No. of lights	Lineal ft. of crack	Area sq. ft.	
(2) 1	2'-6"	6'-8"	Door	9.2	8.4	69 Cfm
1	24"	20"	2	14.7	8.9	
1	24"	16"	2	13.3	7.4	

		Coef.	Btu
Infiltration	37.2	38	1414
Glass	24.7	50	1235
Exp. wall	162		
Net exp. wall	146	6.5	949
Int. wall			
Ceil.	90	5.6	504
~~Cellar~~ floor	90	7	630
Total Btu.			4732

Required sq. ft. E.D.R. or sq. ins. W.A. Leader area

1 Fl. Dining Room | Length 11'-6" | Width 9'-0" | Height 8'-3"

Windows and Doors—Crackage and Area

No.	Width of pane	Height of pane	No. of lights	Lineal ft. of crack	Area sq. ft.	
2	20	20	2	27.4	15.4	51 Cfm

		Coef.	Btu
Infiltration	27.4	38	1041
Glass	15.4	50	770
Exp. wall	75		
Net exp. wall	60	6.5	390
Int. wall			
Ceil.	104	5.6	582
~~Cellar~~ floor	104	7	728
Total Btu.			3511

Required sq. ft. E.D.R. or sq. ins. W.A. Leader area

1 Fl. #1 Bed Room | Length 11'-6" | Width 9'-6" | Height 8'-

Windows and Doors—Crackage and Area

No.	Width of pane	Height of pane	No. of lights	Lineal ft. of crack	Area sq. ft.	
2	24"	24"	2	32	21	69 Cfm

		Coef.	Btu
Infiltration	32	38	121
Glass	21	50	105
Exp. wall	174		
Net exp. wall	153	6.5	99
Int. wall			
Ceil.	115	5.6	64
~~Cellar~~ floor	115	7	80
Total Btu.			471

Required sq. ft. E.D.R. or sq. ins. W.A. Leader area

1 Fl. Bath Room | Length 7'-0" | Width 6'-0" | Height 8'-

Windows and Doors—Crackage and Area

No.	Width of pane	Height of pane	No. of lights	Lineal ft. of crack	Area sq. ft.	
1	24"	20"	2	14.7	8.9	26 Cfm

		Coef.	Btu
Infiltration	14.7	38	55
Glass	8.9	50	44
Exp. wall	58		
Net exp. wall	49	6.5	31
Int. wall			
Ceil.	39	5.6	21
~~Cellar~~ floor	39	7	27
Total Btu.			181

Required sq. ft. E.D.R. or sq. ins. W.A. Leader area

1 Fl. #2 Bed Room | Length 13'-6" | Width 10'-0" | Height 8'

Windows and Doors—Crackage and Area

No.	Width of pane	Height of pane	No. of lights	Lineal ft. of crack	Area sq. ft.	
1	24"	24"	2	16.0	10.5	90 Cfm
1	30"	24"	2	17.5	12.7	

		Coef.	Btu
Infiltration	33.5	38	127
Glass	23.2	50	116
Exp. wall	195		
Net exp. wall	172	6.5	111
Int. wall			
Ceil.	209	5.6	117
~~Cellar~~ floor	209	7	146
Total Btu.			618

Required sq. ft. E.D.R. or sq. ins. W.A. Leader area

The standard form above must be used for all jobs. The contractor, fills it out and submits to the department with the plan of the system. The inspector takes the plan, heat loss sheet and permit to the job when he makes the "roughing in" inspection and again on the final inspection. Left, and on following pages are firing device applications.

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APPLICATION FOR OIL BURNER PERMIT

Permit No. N 4567

Location 1234 Minnesota Ave

John E. Nelson Minneapolis, Minn. Oct. 26 1939

~~LOUIS CLOUSING~~, Inspector of Buildings:

The undersigned hereby makes application for a permit for the work herein specified, agreeing to do all such work in strict accordance with the City ordinances and rulings of the Department of Buildings.

Owner John Doe

Kind of Building Frame Used as Dwlg.

To be begun about Oct. 30 1939

To be completed about Nov. 10 1939

Estimated Cost, $ 275 00

Old-~~New~~ Building Application No.

Electrical Permit No.

DESCRIPTION OF WORK

NOTE: Insert, before each item, the word, install, add, alter or repair, according to which is to be done, and before each item of existing equipment insert the symbol, (E). Under "Remarks," itemize removals, if any, and alterations to equipment.

Install 1 Burners: Name Sun

Type Gun Size No 2-B, Nozzle Cap'y 1.35 gals. per hour.

Install 2 Tanks: Capacity of each 275, Gauge of metal 16.

Location of Tanks Bsmt. If inside, distance from fire or flame 12 ft.

Size of Fill Pipe 1½" Size of Vent Pipe 1¼"

Chimney flue dimensions 8"X12"

Remarks:

Signed Minneapolis Oil Burner Co

By John Smith

Inspected by S. M. Streed Date approved Nov 15 1939

D-58 1936

Price Per Opening in 101 Cities

ONCE again, as we did in January, 1939, AMERICAN ARTISAN publishes its survey of Price per Opening in typical cities. This year the survey covers 101 towns and cities.

It should be emphasized, as was pointed out last January, that publication of this survey does not indicate that AMERICAN ARTISAN believes Price per Opening is the BEST method of pricing jobs. AMERICAN ARTISAN does, however, believe that where the contractor establishes a Price per Opening *from his own records;* where he uses the method *only on jobs covered by records used;* and where the price is not set by others in the community—Price per Opening is a *sound pricing method.*

In sending questionnaires this year, not more than five questionnaires were mailed to any city no matter how large. In most cases one or two were mailed to selected contractors who, we felt, knew something about conditions in their city. The great majority of replies showing *average* Prices per Opening and not the reporting contractor's own price, indicates that contractors cooperated whole-heartedly.

We should like to take this opportunity to publicly thank each of the contractors whose questionnaire is used. They did a splendid job.

Since many towns were reported by only one contractor it is obvious that the answers shown are not *exactly* correct for every contractor in that town. We do feel that the replies represent averages.

This tabulation warrants study. Some of the col-

State	City	Number of Firms Reporting	Labor Data					Average Price of Opening Quoted in City	Price per Opening Firm Reporting Quotes	Type of Work Covered						P/O Includes Supply and Return		Return			Supply								Finish			
										Price per Opening is For			Price per Opening is For					P/O Includes This Return Construction			P/O is Based on		Price per Opening Quoted is For This Type of Supply System									
			Union or Non-Union	Mechanics Wage Scale per Hour	Helpers Wage Scale per Hour	Number of Helpers Permitted for Each Mechanic	Hours per Week Mechanics Work			New House Work	Old House Work	Either New or Old House Work	Either First or Second Floor Openings	P/O for First Floor	P/O for Second Floor	Supply and Return	Return P/O is	Unlined but Panned Joists	Paper Lined and Panned Joists	Complete Metal Ducts	Standardized Duct Sizes	Pipe Sized to Room Requirements	Rectangular Mains and Rectangular Branches	Rectangular Mains and Round Pipe Branches	Complete Round Pipe System	Air Flow Fittings	Side or Top Tap Takeoffs	Supply and Return Plenums	Painting Ducts	Full Asbestos Cover	Three Ply Air Cell	Taping Joints Only
Alabama	Anniston	1	Union	$1.00	30c to 40c	1 to 1	40	$20	←	Yes	Yes	Yes	No	$20	$25	Yes	←	No	No	Yes	No	Yes	Yes	Yes	—	Yes	Yes	No	No	Yes	No	No
California	San Jose	1	Non-Union	$1.375	$ .825	—	40	→	$40	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	Yes	No	No	Yes	No	No	Yes	Yes	No	Yes	No	No
Colorado	Ft. Collins	1	Non-Union	75c to 90c	50c	1 to 1	48	→	$15 to $18	Yes	Yes	Yes	No	$15	$20	Yes	←	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes W. A.	No	Yes C.A.
Connecticut	Norwalk	1	Union	$11 per per day	$4.80 per day	1 to 4	40	$22	←	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No
Florida	Clear Water	1	Open	90c	50c	2 to 1	44	→	$30	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	Yes	No
	West Palm Beach	1	Union	$1.50	60c	1 to 1	40	$28	$33	Yes	No	No	Yes	←	←	Yes	←	—	—	—	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No
Georgia	Atlanta	3	Both	65c to $1.00	30c to 70c	1 to 4	Unlimited for Non-Union; 40 for Union	$13 to $18	←	Yes	No	No	No	$13 to $16	$15 to $18	Yes	←	Yes ←	No —	Yes —	Yes —	Yes Not	No e 3 -	Yes —	Yes —	Yes —	Yes →	Yes	No	No	No	Yes
Illinois	Dundee	1	Non-Union	$1	75c	1 to 1	44	→	$21-$25	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	No	Yes
	E. St. Louis	2	Union	$1.50	40c	1 to 2	40	→	$25	Yes	No	No	→	$25 $20	$33 $28	Yes	←	Yes	No	No	Yes No	No Yes	Yes	No	No	Yes	No	Yes	No	No	No	No
	Geneva	1	Union	$1.25	—	1 to 1	40	$20	←	Yes	No	No	→	$20	$23	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No
	Hinsdale	1	Non-Union	$1.10	60c	Unlimited	40	$18 to $20	$20	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	Yes	No	No	Yes	No	No	Yes	No	No	No
	Peoria	1	Union	$1.375	—	1 to 3	40	$20	←	Yes	No	No	No	$18	$24	No	$16	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	No
	Wilmette	1	Union	$1.875	—	—	40	→	$24	Yes	No	No	No	$20	$26	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No
	Waukegan	1	Union	$1.75	$1.25	1 to 3	40	→	$23	Yes	No	No	No	$19	$23	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No
Indiana	Elkhart	2	Both	60c to 90c	40c	1 to 1	40-42	$9-$17	$16	←	Yes	No	Yes	←	←	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	No	Yes
	Ft. Wayne	1	Union	$1	60c	1 to 1	40	$14-$19	←	Yes	No	No	No	$15	$19	Yes	←	Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	No	Yes	No	No	Yes
	Hammond	1	Non-Union	$1	60c	1 to 1	40 up	$12-$30	$26	$26	$30	←	No	$26	$36	Yes	←	No	No	Yes	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No
	Lafayette	1	Union	$1.25	Varies	1 to 4	40	$18-$20	←	Yes	No	No	Yes	←	←	Yes	←	—	—	—	No	Yes	Yes	No	No	Yes	No	No	No	No	No	Yes
	New Albany	1	Non-Union	65c-70c	40c-45c	Unlimited	44	$15	←	Yes	No	No	Yes	←	←	No	$12	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	No	No	No
	Richmond	1	Open	75c	45c	1 to 1	55	$16	←	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	Yes
	South Bend	1	Union	$1.25	75c	1 to 1	40	$20	←	Yes	No	No	Yes	No	No	Yes	←	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	Yes
	Terre Haute	1	Union	$1.20	75c	1 to 1	40	→	$20	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	Yes
	W. Lafayette	1	Non-Union	90c	50c-60c	1 to 1	40	$15-$20	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	No	Yes	No	Yes	No	Yes	No	Yes	Yes	No	No	Yes

umns should be studied in detail, because they indicate where some of the low prices originate. The first half of the tabulation showing what the contractor gives for the money he charges, is surprisingly consistent. Of course certain differences appear, but, in the main in large cities and in small towns the contractors are giving just about the same systems. This is particularly true in the columns showing whether or not the quoted Price per Opening is for New House Work, Old House Work, or Either. Generally, Price per Opening is used mostly on new house jobs.

Also the kind of duct work installed; whether the quoted prices apply to either first or second floors; whether to returns and supplies; are surprisingly consistent. We believe that this similarity is due to the fact that contractors really want to use some method like this to save time and cost and, also, to the fact that having found the method practical, contractors have really investigated to find what they can give for the money they can charge.

In the second half of the tabulation, there is wide difference in the percentages contractors add for Overhead and Profit and on the items he applies the percentages. In these columns are found the widest of variations and a likely reason for the differences in prices quoted. It is our opinion that contractors generally are not adding enough for profit and overhead. Some of the most successful concerns we know, whose reports are included, show the *highest* percentages added for profit and overhead. Probably here, better than any other place, the industry can apply further study and the courage to ask what is needed.

We have tried to show by arrangement, the wide difference in charges asked by other trades, such as electricians; also how in some towns the contractor's own men can wire or install. Some of the electrical charges seem to us to be completely out of line with services rendered. In these towns, these charges need overhauling.

This report of Prices per Opening for 101 cities is published for the study of the industry. Insofar as possible the editors will be glad to answer questions.

Three Ply Air Cell	Taping Joints Only
No	No
No	No
No	Yes C.A.
No	No
Yes	No
No	No
No	Yes
No	Yes
No	No
No	No
No	No
No	No
No	Yes
No	Yes
No	No
No	Yes
No	No
No	Yes
No	Yes
No	Yes

Smoke Pipe		Plans		Accessories and Accessory Profit										Carpenters				Electricians				Tanks, Piping						
									Electricians Are Paid									Electricians Charge Is										
P/O Includes Smoke Pipe?	Material Used	P/O Includes Measuring Up Job in House	P/O Includes a Plan Given Customer	P/O Includes Furnace and Blower Cost	% Added for Profit and Overhead to Net Cost of Furnace and Blower	P/O Includes Control Equipment Cost	% Added for Profit and Overhead to Net Cost of Controls	P/O Includes Cost of Installing Controls	Flat Price per Job	Wage Rate per Hour and Rate	% Added for Profit and Overhead Over Net Labor Cost of Electricians	P/O Includes Registers	% Added for Profit and Overhead to Net Cost of Registers	P/O Includes Cutting Holes	Openings are Cut by —	Carpenters are Paid for Each Opening	% Added for Profit and Overhead to Carpenter Labor	Forced Air, Gas-Fired	Forced Air, Oil-Fired	Forced Air, Stoker-Fired	Forced Air, Hand-Fired	P/O Includes Oil Tank	Charge for Setting Inside Tank	Charge for Setting Outside Tank	Does Gas Co. Pipe Gas to Burner? What Charge?	Where Contractor Does Not Sell Equipment, P/O Is	Where Contractor Does Not Sell Equipment, Charge for Setting Furnace Is	Where Contractor Does Not Sell Equipment, Charge for Installing Controls Is
No	GI	No	No	No	35%	No	40%	No	No	$1.50	—	Yes	40%	Yes	Own Men	—	—	—	—	$10	$7.50	—	—	—	Owner	$35 to $40	$210	$15
Yes	GI	Yes	Yes	Yes	30%	Yes	30%	Yes	$10	No	0%	Yes	30	No	Carp.	—	—	$10	—	—	—	Note 1	—	—	Contr.	$12.50 to $25	$10	—
No	←	Yes	Yes	No	25%	No	25%	No	No	$1.25 Note 2	20%	Yes	0%	Yes	Carp.	$1.25 to $1.50	0%		$7.00 to	$15.00		No	—	—	Plumb	—	$12	$10
Yes	GI	Yes	No	No	33⅓%	No	33⅓%	No	Yes	No	—	Yes	33⅓%	No	Carp.	?	?	$15	$25	$25	$10	No	$50	$85	$15	$24	$20	$25
Yes	GI	Yes	No	No	25%	Yes	25%	Yes	No	Yes	25%	Yes	30%	No	Carp.	—	0%	$20	$30	—	—	No	$28	$38	$15	$25	$20	$20
No	No	Yes	Yes	No	10%	No	10%	No	$25	No	0%	No	10%	No	Own Men	←	←	$25	$25	—	—	No	—	—	—	?	$10 to $20	—
Yes	GI	Yes	Usually	No	30%	No	30%	No	Yes	←	30%	Yes	30%	Yes	Own Men	←	30%	$18	$20	$20	0	No	$60	$85	35c for 1 in. 40c for 1¼ in. 45c for 1½ in.	?	$15	$20
No	Yes	Yes	GI	Yes	Yes	No	25%	No	25%	Yes	←	←	←	Yes	←	Yes	Own Men	←	←	?	?	?	?	No	—	$8	—	$25	$20	$35
No	No	No	GI	Yes	Yes	No	25%-33⅓%	Yes	25%	No	←	25%	No	25%-33⅓%	No	Yes	←	←	?	$35	$30	$15	No	—	—	?	$9 to $30	$20-$50	—
No	No	Yes	GI	Yes	No	No	10%	No	10%	No	Yes	←	10%	No	10%	No	Yes	←	←	←	?								
No	No	No	—	Yes	Yes	No	35%	No	40%	Yes	←	←	←	Yes	←	Yes	←	←	←	$12 to $15	←	←	$12	No	?	?	$12 to $20	?	—	—
No	No	Yes	Yes	No	50%	No	50%	No	Time	& Mat.	10%	Yes	50%	No	Carp.	?	?	$10	$12 to $15	$15	$10	No	$20	?	$15	$30	$20	$15
No	No	Yes	Yes	Yes	40%	Yes	—	Yes	$6	←	0%	Yes	←	No	Carp.	←	←	$15	$15	—	$6	Yes	—	—	$10	Same	—	—
No	No	Yes	No	No	20%	No	—	No	Yes	←	0%	Yes	←	No	Carp.	?	←	$20	—	—	—	No	—	—	—	?	—	—
No	No	No	—	Yes	Yes	No	20%	No	25%	No	$2.25	20%	Yes	20%	No	Lwn Men	←	20%	$18	$25	$25	$14	No	$14	$40	$15	—	—	—
No	Yes	No	—	Yes	Yes	No	30%	No	20%	Both	No	$1	10-15%	Yes	20-30%	Yes	Both	—	0-30%	$15	$15	$12	$6 to $8	No	$35	$60	—	$13-$15	$12-$20	$18
No	Yes	No	—	Yes	Yes	No	30%	No	25%	No	Yes	←	15%	No	30%	Yes	Own Men	←	15%	$15	$15	$15	$10	No	—	—	$10-$20	$16-$24	$12-$20	$15
No	No	No	—	Yes	Yes	No	30%	No	30%	Yes	$25	←	10%	Yes	30%	Yes	Carp.	$1.50	10%	$25	$25	$25	$15	No	$14 up	—	$10	—	$30	$25
No	Yes	Yes	GI	Yes	Yes	No	30%	Yes	←	No	No	Note 4	10%	Yes	25%	No	Carp.	$2	10%	$10-$15	—	—	$7	No	$10 to $25	—	$8-$20	$20	$15	$20
No	No	No	—	Yes	Yes	No	33⅓%	No	25%	Do Own	n Installing		—	Yes	25%	Yes	Own Men	←	—	—	—	—	—	No	$75	$125	—	—	$10	—
No	Yes	Yes	GI	Yes	Yes	No	60%	No	60%	No	Yes	←	29%	Yes	40%	Yes	Own Men	←	—	—	$10	$9.50	$5.50	No	—	—	—	$17.50	—	—
No	Yes	Yes	GI	Yes	No	No	?	No	0%	No	No	$1.15	0%	Yes	0%	Yes	Own Men	←	0%	?	$15	?	?	No	$10	$20	—	$20	$25	$15
No	Yes	No	—	No	No	No	—	No	—	No	No	$1.35	10%	Yes	30%	Yes	Own Men	—	—	$25	$25	$25	$15	No	—	—	—	$20	—	—
No	Yes	Yes	GI	Yes	Yes	No	33⅓%	No	List	No	Yes	←	33⅓%	Yes	—	No	Carp.	—	—	$10	$10	$15	$7.50	No	$50	$75	$15	$20	$15	$15

State	City	Number of Firms Reporting	Labor Data					Average Price of Opening Quoted in City	Price per Opening Firm Reporting Quotes	Type of Work Covered						P/O Includes Supply and Return		Return			Supply										Finish				Smoke Pipe	
										Price per Opening is For			Price per Opening is For					P/O Includes This Return Construction			P/O is Based on		Price per Opening Quoted is For This Type of Supply System													
			Union or Non-Union	Mechanics Wage Scale per Hour	Helpers Wage Scale per Hour	Number of Helpers Permitted for Each Mechanic	Hours per Week Mechanics Work			New House Work	Old House Work	Either New or Old House Work	Either First or Second Floor Openings	P/O for First Floor	P/O for Second Floor	Supply and Return	Return P/O is	Unlined but Panned Joists	Paper Lined and Panned Joists	Complete Metal Ducts	Standardized Duct Sizes	Pipe Sized to Room Requirements	Rectangular Mains and Rectangular Branches	Rectangular Mains and Round Pipe Branches	Complete Round Pipe System	Air Flow Fittings	Side or Top Tap Takeoffs	Supply and Return Plenums	Painting Ducts	Full Asbestos Cover	Three Ply Air Cell	Taping Joints Only	P/O Includes Smoke Pipe?	Material Used
Iowa	Iowa City	1	Non-Union	75c-85c	50c	1 to 1	44	$10	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	—
	Sioux City	2	Union	$1	50c	1 to 1	44	$38-F.A. $28-Gravity	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	—
Kansas	Topeka	1	Non-Union	75c	50c	Unlimited	42	$16.50	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes	GI
	Wichita	1	Note 5	$1	50c	?	40	$15-$20	←	→	→	Yes	No	Plus sec flo	$2 for ond or	Yes	←	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes	GI
Maine	Portland	1	Non-Union	75c	39c	1 to 1	40	→	$15-$20	Yes	No	No	No	$15	$20	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	—
Massachusetts	Boston	1	Union	$1.44	→	None	40	$25	→	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	—
	Lynn	1	Union	$1.375	→	None	40	$22-Union $12-Non-Union	←	Yes	No	No	Yes	←	←	Yes	←	—	—	—	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes	GI
	New Bedford	1	Union	90c	50c	Unlimited	44	$18-$22	←	Yes	No	No	Yes	←	←	Yes	←	—	—	—	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	—
	North Adams	1	Union	$8 per day	$4 per day	1 to 1	40	→	$18	Yes	No	No	Yes	←	←	Yes	←	—	—	—	Yes	No	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes	GI
	Worcester	2	Union	$1.125	65c	Unlimited	40	→	$25	Yes	—	—	Yes	—	—	No	$35	No	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	Yes	GI
Michigan	Ann Arbor	2	Non-Union	$.80-$1.25	50c-75c	—	44	$12-$25	←	Yes	No	No	No	$12-$20	$15-$25	Yes	←	Yes	No	No	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	Yes	No	←
	Benton Harbor	1	Non-Union	$.75	50c	2 to 1	44	$12-$15	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	Yes	GI
	Detroit	4	Non-Union	$1	65c	—	44	$7-$13	←	Yes	No See Note 7	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No	No	—
	Lansing	2	Non-Union	$.70-$1	45c-60c	—	40-48	$10-$13	←	Yes	No	No	No	$8	$13	No	$12	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	—
	Midland	1	Non-Union	90c	65c	Unlimited	48	$12-$18	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	No	Yes	No	Yes	No	Yes	No	No	No	Yes	Yes	GI
	Pontiac	2	Non-Union	95c	60c-70c	Unlimited	44-50	$15	←	Yes	No	No	Yes	No	No	Yes	←	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Both	GI
	Port Huron	1	Non-Union	70c	40c	—	44	→	$18	→	→	Yes	Yes	←	←	Yes	←	Yes	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	No	No	—
Minnesota	Minneapolis	3	Union	$1.25	75c	1 to 3	40	$14-$18	←	Yes	No	No	No	$14-$18	$18-$20	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	Both	—
	St. Paul	3	Both	$.75-$1.25	35c-75c	1 to 3	40	→	$15-$20	$17-$20	$18-$20	←	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Some	No	No	No	Yes	GI
Missouri	Joplin	1	Union	$.875	50c	1 to 1	44	$16	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	Yes	Yes	GI
	Kansas City	3	Both	$.75-$1	50c	1 to 1	40-44	$9-$15	←	$15	$ 12.50 Note 8	←	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	Yes	No	No	No	No	—
	St. Louis	1	Non-Union	70c	35c	Unlimited	40-80	$7-$13	←	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	No	No	Yes	GI
Nebraska	Omaha	3	Both	90c-$1	50c-60c	1 to 4	40-44	$15-$25	←	$15-$25	$15-$28	←	No	$15-$25	$20-$41	No	$8-$14	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	No	—
New Hampshire	Manchester	1	Non-Union	70c	30c	1 to 1	40-42	$12-$20	←	Yes	No	←	←	$16	$20	No	$16	No	Yes	Yes $16	Yes	No	No	Yes	No	Yes	No	No	Yes	No	No	No	No	—
	Nashua	1	Non-Union	75c	55c	2	44	→	$ 17.50	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	Yes	No	No	Yes	Yes	No	No	No	No	Yes	GI
New Jersey	Asbury Park	1	Union	$1.25	70c	1 to 1	40	$18	←	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	No	Yes	No	—
	Camden	2	Non-Union	80c	40c	1 to 2	44	$11-$20	←	Yes	No	←	No	$11-$15	$15-$20	Yes	←	Yes	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No	No	Yes	No	—
	New Brunswick	1	Union	$1.50	75c	1 to 3	40	$20	←	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	No	Yes	No	—
	Patterson	1	Non-Union	$1.10	52½c	1 to 1	40	$ 12.50 $20	←	$ 12.50	$20	←	Yes	←	←	Yes	←	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	Yes	GI
	Plainfield	1	Non-Union	$1	50c-60c	1 to 2	44	→	$ 14.50 $16	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	—
	Union City	1	Union	$13.20 per day	$4 per day	1 to 4	40	$15	$18	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes	GI
New York	Albany	1	Union	$1.20	62½c	1 to 4	40	$11	←	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No	No	←
	Binghamton	1	Union	$1	42½c	1 to 1	40	→	$9.50 11.50 33⅓%	Yes	No	←	Yes	Yes	←	Yes	←	No	No	Yes	No	Yes	$11.50	$10.50	$9.50	Yes	No	Yes	Yes	No	No	Yes	Yes	GI
	Brooklyn	1	Non-Union	$5-$6 a day	$2-$2.50 a day	Unlimited	Any No.	$20	←	Yes	No	←	Yes	←	←	Yes	←	Yes	No	No	No	Yes	Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	No	←
	Buffalo	2	Non-Union	$1	65c	1 to 1	44	$15-$20	←	Yes	Yes	Yes	No	$16	$20	No	$22-$28	No	No	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	No	←
	Cortland	1	Non-Union	60c	40c	Unlimited	48	→	$18	→	→	Yes	Yes	←	←	Yes	←	Yes	No	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes	No	No	Yes	Yes	GI

Finish			Smoke Pipe		Plans		Accessories and Accessory Profit										Carpenters				Electricians				Tanks, Piping						
											Electricians Are Paid										Electricians Charge Is										
	Three Ply Air Cell	Taping Joints Only	P/O Includes Smoke Pipe?	Material Used	P/O Includes Measuring Up Job in House	P/O Includes a Plan Given Customer	P/O Includes Furnace and Blower Cost	% Added for Profit and Overhead to Net Cost of Furnace and Blower	P/O Includes Control Equipment Cost	% Added for Profit and Overhead to Net Cost of Controls	P/O Includes Cost of Installing Controls	Flat Price per Job	Wage Rate per Hour and Rate	% Added for Profit and Overhead Over Net Labor Cost of Electricians	P/O Includes Registers	% Added for Profit and Overhead to Net Cost of Registers	P/O Includes Cutting Holes	Openings are Cut by —	Carpenters are Paid for Each Opening	% Added for Profit and Overhead to Carpenter Labor	Forced Air, Gas-Fired	Forced Air, Oil-Fired	Forced Air, Stoker-Fired	Forced Air, Hand-Fired	P/O Includes Oil Tank	Charge for Setting Inside Tank	Charge for Setting Outside Tank	Does Gas Co. Pipe Gas to Burner? What Charge?	Where Contractor Does Not Sell Equipment, P/O Is	Where Contractor Does Not Sell Equipment, Charge for Setting Furnace Is	Where Contractor Does Not Sell Equipment, Charge for Installing Controls Is
o	No	Yes	No	—	Yes	Yes	No	20%	No	20%	No	Time ter $12-→	& Material $30	10%	Yes	10%	Yes	Both	—	0%	$12-$30	—	—	—	No	$40	$75	$18	$10	—	—
o	No	Yes	No	—	Yes	Yes	No	33⅓%	No	List	No		Yes	33⅓%	Yes	33⅓%	No	Carp.	—	—	$12	$15	$15	$10	No	$25	$15	—	$38	$25	—
o	No	Yes	Yes	GI	Yes	Yes	No	25%	No	25%	No	Yes	←	10%	Yes	—	Yes	Own Men	←	←	$12	?	?	?	—	—	—	—	$18	—	—
o	No	Yes	Yes	GI	No	No	No	20-25%	No	10%	No	$15	←	10%	No	10%	Yes	Carp.	—	—	$15	—	—	—	No	?	?	—	$15-$20	Time	$15
o	No	No	No	—	No	Yes	Yes	25-30%	Yes	25-30%	No	No	$1.25	0%	Yes	25-30%	No	Carp.	←	0%	—	$25	—	$7-$8	No	$35	—	—	Same	—	—
o	No	No	No	—	Yes	Yes	No	20%	No	20%	No	Yes	←	20%	Yes	20%	No	Carp.	$1.75	20%	$25	$25	$25	$15	No	$35	$50 Note 6	$20-$60	$30	$25	$25
o	No	Yes	Yes	GI	Yes	Yes	No	20%	No	20%	No	Yes	←	?	Yes	List	No	Carp.	Owner Pays	←	?	$27	—	—	No	$35	Cost+20%	Gas Co.	$22	$25	$30
o	No	No	No	—	Yes	No	No	5-30%	No	25%	No	No	Yes	?	Yes	List	No	Carp.	$1	0%	—	$15	—	—	No	$35	$65-$75	—	$18-$25	$20	$15
o	No	No	Yes	GI	Yes	No	No	20%	No	20%	No	No	Yes	0%	No	20%	No	Carp.	$2	0%	—	$17	—	—	No	—	—	—	$18	—	—
o	No	No	Yes	GI	Yes	No	No	25%	No	25-30%	No	Yes	←	25%	Yes	List	No	Carp.	?	—	$30	$30	$30	$15	No	—	—	—	?	—	—
o	No	Yes	No	←	No	No	No	35%	No	25%	No	Yes	←	0%	Yes	25-40%	Yes	Own Men	←	—	$10-$20	$10-$20	$8-$12	$8-$20	No	$25	$45	Time	—	$20	$20
o	No	No	Yes	GI	Yes	Yes	No	25%	No	25%	No	No	Yes	0%	Yes	25%	Yes	Own Men	←	—	$12	$18	$18	$12	Yes	—	—	$6	$15	—	—
	No	No	No	—	Yes	Yes	No	0-20%	No	0-20%	No	$14-$16	←	0%	Yes	0%	No	Carp.	←	←	$14-$16	$16-$18	$16-$24	$6-$11	No	$45	$90	$10-$15	$20	$16	—
	No	No	No	—	Yes	Yes	No	33⅓%	No	33⅓%	Yes	Yes	←	0-10%	Yes	0-30%	Both	Own Men	←	←	$15	$20	$25	$10	No	$15-$20	$35	$10	$15	$10	$15
	No	Yes	Yes	GI	Yes	Yes	No	33⅓%	No	25%	No	No	$1.40	10%	Yes	25%	Yes	Own Men	←	0%	$13.50	—	$10-$12	$10	No	?	?	$8-$10	$20	$15	$15
	No	No	Both	GI	Yes	Yes	No	20-33⅓%	No	20-33⅓%	No	Yes	Yes	0%	Yes	25%	No	Carp.	—	0%	—	$15-$30	$15-$30	$10-$15	No	—	—	—	$16-$20	$15	—
	No	No	No	—	Yes	Yes	No	35%	No	35%	No	Yes	No	15%	Yes	0%	No	Carp.	$1.50	15%	—	—	—	$15	No	—	—	?	$20	—	—
	No	No	Both	—	Yes	No	No	30%	No	30%	No	Yes	No	10-30%	Yes	30%	Yes	Carp.	$1.25	0%	$18-$25	$18-$25	$18-$25	$12-$15	No	$15-$20	Time	$15	$12-$15	$12-$15	$12-$25
	No	No	Yes	GI	Some	Some	1—No 2—Yes	25-30%	1—No 2—Yes	30-50%	1—No 2—Yes	Yes	$7.50-$18.50	25-33⅓%	1—No 2—Yes	25-50%	Yes	Carp.	—	0-25%	$18	$16	$7.50-$25	$7.50 up	Both	$12-$25	Time	$15	$18-$25	$10-$20	$18-$25
	No	Yes	Yes	GI	Yes	No	No	30%	No	30%	Yes	—	Yes	30%	Yes	30%	No	Carp.	$1	30%	$10	$15	$15	$7.50	No	$10	$15	—	—	—	—
	No	No	No	—	Yes	Yes	No	25%	No	25%	Yes	75c	10%	Yes	25%	Yes New, No, Old	Carp. New, Own, Old	80c-$1	0%	$15	$15	$15	$10	No	?	$35 up	$15	$10-$15	$25	$15
	No	No	Yes	GI	Yes	Yes	No	5%	No	5%	Yes	Yes	←	0%	Yes	0	No	Carp.	—	0%	$8-$15	$14	$14	$8	No	—	$75	—	$7-$13	?	$15
	No	No	No	—	Yes	Sometimes	No	33⅓%	No	33⅓%	No	No	$1.50	20-33⅓%	Yes	33⅓%	No—New Yes—Old	New, Carp.	—	—	$15	$20	$20	$12	No	$100 Note 9	$150 Note 9	$15-$30	$20	$30	$30
	No	No	No	—	Yes	Yes	No	32%	No	No	Note 10	←	65c	32%	Yes	32%	New, No Old, Yes	Own Men	←	—	Own e	lectrici	ans at	65c	No	$55	$85	None	$12-$14	$6	$15
	No	No	Yes	GI	Yes	No	No	50%	No	50%	No	Yes	←	20%	Yes	—	No	Carp.	Owner	Pays	—	$18	$18	—	No	$40	—	—	?	$25	$18
	No	Yes	No	—	Yes	No	No	33⅓%	No	33⅓%	No	Yes	←	25%	Yes	33⅓%	No	Carp.	$1	25%	$15	$15	$15	$8	No	$30	$45	$28	$18	$25	$15
	No	Yes	No	—	Yes	Sometimes	No	20%	No	0-20%	No	Yes	←	0-10%	Yes	20-30%	No	Carp.	$1	0-10%	$20	$20	$20	$15	No	$35	$85	—	$15-$25	$10-$20	$10-$20
	No	Yes	No	—	Yes	No	No	—	No	—	No	$20-$30	$1.50	—	Yes	0%	No	Carp.	$1	20%	$25	$25	$25	$15	Yes	—	—	—	$20	$20	$25
	No	No	Yes	GI	No	No	No	30%	No	30%	No	Yes	←	10%	Yes	0%	Yes	Own Men	←	0%	$12.50	$15	$15	$10	No	$37	$58	No	—	$35	$10-$23
	No	No	No	—	No	Yes	No	20%	No	20%	No	Yes	←	20%	Yes	20%	No	Carp.	G.C.	←	$5	$7	—	$3	No	$7	$30	Own Men	$14-$16	$10	$7
	No	No	Yes	GI	Yes	Yes	No	20%	No	20%	No	Yes	←	0%	Yes	0%	No	Own Men	←	0%	$10	$10	$10	$10	No	$20	$45	$8 —	$15	$30	$10
	No	No	No	←	Yes	No	No	—	No	—	No	—	—	—	Yes	←	No	Carp.	—	—	—	$15	—	—	No	—	—	?	$11	—	—
	No	Yes	Yes	GI	No	No	No	33⅓%	No	33⅓%	No	No	Yes	33⅓%	Yes	←	Yes	Carp.	50c	33⅓%	$18	—	—	$9	—	—	—	$10 Own Men	Same as Col. 9	$12	$18
	No	Yes	No	←	Yes	Yes	No	Note 12	No	Note 12	Note 12	←	←	←	Yes	?	No	Carp.	Note 13	←	→	→	→	→	No	$125 See N	$150 ote 14	$15-$25	Same as Col. 9	$10	$15
	No	Yes	No	←	Yes	Yes	No	25%	No	25%	No	Yes	←	25%	Yes	25%	Yes	Own Men	←	25%	$15	$18	$15	$10	No	$6	$15	$5	$1.25 per hr.	$6	$2 each
	No	Yes	Yes	GI	Yes	Yes	No	25%	No	25%	No	Own	Men	←	Yes	25%	Yes	Carp.	—	?	←	Own	Men	→	No	?	?	Own Men	?	Varies	Varies

State	City	Number of Firms Reporting	Labor Data: Union or Non-Union	Labor Data: Mechanics Wage Scale per Hour	Labor Data: Helpers Wage Scale per Hour	Labor Data: Number of Helpers Permitted for Each Mechanic	Labor Data: Hours per Week Mechanics Work	Average Price per Opening Quoted in City	Price per Opening Firm Reporting Quotes	Type of Work Covered: Price per Opening is For: New House Work	Type of Work Covered: Price per Opening is For: Old House Work	Type of Work Covered: Price per Opening is For: Either New or Old House Work	Type of Work Covered: Price per Opening is For: Either First or Second Floor Openings	Type of Work Covered: Price per Opening is For: P/O for First Floor	Type of Work Covered: Price per Opening is For: P/O for Second Floor	P/O Includes Supply and Return: Supply and Return	P/O Includes Supply and Return: Return P/O is	Return: P/O Includes This Return Construction: Unlined but Panned Joists	Return: P/O Includes This Return Construction: Paper Lined and Panned Joists	Return: P/O Includes This Return Construction: Complete Metal Ducts	Supply: P/O is Based on: Standardized Duct Sizes	Supply: P/O is Based on: Pipe Sized to Room Requirements	Supply: Price per Opening Quoted is For This Type of Supply System: Rectangular Mains and Rectangular Branches	Supply: Price per Opening Quoted is For This Type of Supply System: Rectangular Mains and Round Pipe Branches	Supply: Price per Opening Quoted is For This Type of Supply System: Complete Round Pipe System	Supply: Price per Opening Quoted is For This Type of Supply System: Air Flow Fittings	Supply: Price per Opening Quoted is For This Type of Supply System: Side or Top Tap Takeoffs	Supply: Price per Opening Quoted is For This Type of Supply System: Supply and Return Plenums	Finish: Painting Ducts	Finish: Full Asbestos Cover	Finish: Three Ply Air Cell	Finish: Taping Joints Only	Smoke Pipe: P/O Includes Smoke Pipe	Smoke Pipe: Material Used
	Geneva	1	Union	$1	50c-70c	2 to 5	40	→	$16	→	→	Yes	Yes	Extra 2nd i hou	for n old ses	Yes	←	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	Yes	No	No	Yes	Yes	GI
	Huntington, L. I.	1	Non-Union	$10 a day	$6 a day	1 to 1	40	$20	←	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	No	←
	Jamestown	1	Union	$1	50c	1 to 4	40	$15-$25 Note 15	$22	Yes	No	No	Yes	←	←	Yes	←	Yes	No	Note 15	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	GI
	Lockport	1	Non-Union	$1.25	75c	Unlimited	44	→	$12.50	Yes	No	←	No	$11	$14	No	$14.50	Yes	No	No	Yes	No	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No	←
	Mt. Vernon	1	Union	$1.65	85c	1 to 3	35	→	$22	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No	Some	No	←
	Newburgh	1	Non-Union	$7-$9 a day	$2.50-$5 a day	Unlimited	40-44	→	$40 inc. equip	Yes	$5-$10 more	←	No	$35	$45	Yes	←	Yes	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes	GI
	Niagara Falls	1	Union	$1.25	60c	1 to 1	40	$12-$20	←	Yes	No	←	Yes	←	←	Yes	←	Yes	No	No	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes	GI
	Syracuse	2	Non-Union	65c	40c	1 to 1	44	$10-$15	←	→	→	Yes	No	$10	$15	Yes	←	Yes	←	←	Yes	←	No	Yes	No	No	Yes	Yes	No	No	No	Yes	No	←
	Troy	1	Union	$1.20	50c	1 to 1	40	$15	←	Yes	No	No	Yes	←	←	Yes	←	No	No	Yes	Yes	←	Yes	No	No	Yes	No	Yes	No	No	No	No	No	←
	Watertown	2	Both	90c-$1	45c-50c	1 to 1	44	$10-$20	Union $18.50 Non-Un. $10-$14	→	→	Yes	Yes, No, for N	for U shop $10 on-U	nion $14 nion	Yes	←	Yes	No	No	No	Yes, Un.	No	Yes, Non Un.	Yes, Un.	Yes, Non Un.	No	Yes, Union	No	No	Yes Non Unio	No	←
	White Plains	2	Union	$1.60-$1.65	80c-94c	1 to 3	35	$20-$27.50	←	Yes	No	No	No	$25	$30	Yes	←	No	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes	GI
Nevada	Reno	1	Union	$20 per opening $50 for 1st C.A.	$3.50 per day	1 to 3	40	$20	$15 Grav. $25 F.A.	Yes	No	No	No	$25	$35	No	$50 for 1st; $30 each addtl.	Yes	No	No	No	Yes	Yes if Permissible	No	Yes	No	Yes	No	No	No	No	Yes	GI
So. Carolina	Winston-Salem	1	Non-Union	75c	45c	1 to 1	44	→	$15-$20	Yes	No	No	No	$15	$20	Yes	←	No	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	No	No	Yes	No	←
Ohio	Akron	1	Union	$1.125	60c	1 to 3	40	→	$20	Yes	No	No	No	$18	$24	Yes	←	No	No	Yes Note 18	Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	No	No	←
	Canton	1	Union	$1	50c-80c Note 9	1 to 2	40	→	$18	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	No	Yes	Yes	No	No	No	Yes	Yes	Yes	No	No	No	Yes	GI
	Cincinnati	2	Union	$1.375	65c	1 to 1	40	$23	←	Yes	No	←	Yes	←	←	Yes	←	No	No	Yes	Yes	No	No	No	Yes	No	Yes	No	No	No	Yes	Yes	GI
	Cleveland	4	Both	$1.375 Union; $1.12, Non-Union	45c to Scale Union; 55c Non-Union	1 to 1	40	$14-$24 New $22 O Note 20	← house	Un., Yes s	Non-Un., Yes uses	←	Un., Yes	Non-$15	Un. $25	Yes	←	Non Un.	No	Un.	Non Un.	Un.	Yes	No	No	Yes	No	Yes	No	No	No	No	Yes	GI
	Columbus	3	Non-Union	75c	40c-50c	Unlimited	44	$10-$16	←	Yes	No Note 23	No	No	$10	$16	Yes	←	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	Yes	No	←
	Toledo	2	Union	$1.25	55c	1 to 1	40	→	$16-$21	Yes	$25-$30	←	Yes	←	←	Yes	←	Yes	No	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	No	No	No	←
	Van Wert	1	Non-Union	70c	40c	Unlimited	48	→	$16	$14	$16	←	No	$16	$18	Yes	←	No	No	Yes	No	Yes	Yes	No	No	Yes	No	Yes	No	No	No	Yes	No	←
Oklahoma	Oklahoma City	1	Non-Union	75c	40c	1 to 1	44	→	$18	Yes	No	No	Yes	←	←	Yes	←	Yes	No	No	No	Yes	Yes	No	No	Yes	No	No	No	No	No	No	No	←
Oregon	Portland	1	Union	$1.10	75c	1 to 1	40	→	$15-$17.50	$15	$17.50	←	Yes	←	←	Yes	←	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	No	No	No	No	←
	Salem	1	Non-Union	$6 a day	$4 a day	2 to a Shop	44	$12	←	→	→	Yes	Yes	←	←	Yes	←	Yes	No	No	No	Yes	No	Yes	No	No	Yes	Yes	No	No	No	Yes	Yes	GI

Note 1—Oil dealers sell burner and tank, sell furnace and controls and sublet sheet metal work. Tank is set free of charge by these men.
Note 2—Cost of materials also added to labor charge.
Note 3—Cheapest jobs use unlined, panned joists; better jobs use full metal duct; short cut sizing used on cheap jobs; rectangular mains and branches on best jobs, all round pipe on cheap jobs.
Note 4—Charged by standard sets of controls—$6 to $10 according to type.
Note 5—Report by a firm which sub-contracts sheet metal work. Figures given are based on prices quoted by sub-contractors.
Note 6—Price for setting outside tank does not include any digging.
Note 7—Prices for old house work in Detroit are about $20 per opening with some lower prices being quoted on small houses.
Note 8—Applies only where old registers, stacks are used without change.
Note 9—Quoted prices are for the oil burner. Purchaser of the burner gets the tank free and the setting free.
Note 10—Controls included with blower or blower-furnace unit and do not carry a separate net profit percentage.
Note 11—Contractor reports that in old house work if floor registers can be used, price reduces; baseboard registers are a little higher; if stacks to second floor are left exposed, price is reduced, if stacks must be concealed price is higher. In general prices on old houses are pretty well in line with new house work.
Note 12—The majority of sales in the metropolitan area are made by manufacturers' sales representatives who sub-let the sheet metal work. The representatives make the drawings and furnish controls.
Note 13—Metropolitan practice is to frame the house around the heating system at no cost to the heating contractor.

Finish			Smoke Pipe		Plans		Accessories and Accessory Profit											Carpenters				Electricians				Tanks, Piping						
												Electricians Are Paid									Electricians Charge Is										
Full Asbestos Cover	Three Ply Air Cell	Taping Joints Only	P/O Includes Smoke Pipe?	Material Used	Includes Measuring in House	P/O Includes a Plan Given Customer	P/O Includes Furnace and Blower Cost	% Added for Profit and Overhead to Net Cost of Furnace and Blower	P/O Includes Control Equipment Cost	% Added for Profit and Overhead to Net Cost of Controls	P/O Includes Cost of Installing Controls	Flat Price per Job	Wage Rate per Hour and Rate	% Added for Profit and Overhead Over Net Labor Cost of Electricians	P/O Includes Registers	% Added for Profit and Overhead to Net Cost of Registers	P/O Includes Cutting Holes	Openings are Cut by —	Carpenters are Paid for Each Opening	% Added for Profit and Overhead to Carpenter Labor	Forced Air, Gas-Fired	Forced Air, Oil-Fired	Forced Air, Stoker-Fired	Forced Air, Hand-Fired	P/O Includes Oil Tank	Charge for Setting Inside Tank	Charge for Setting Outside Tank	Does Gas Co. Pipe Gas to Burner? What Charge?	Where Contractor Does Not Sell Equipment, P/O Is	Where Contractor Does Not Sell Equipment, Charge for Setting Furnace Is	Where Contractor Does Not Sell Equipment, Charge for Installing Controls Is
No	No	Yes	Yes	GI	Yes	No	No	25%	No	25%	No	Time	& Mat.	15%	Yes	30%	Yes	Carp.	Varies	—	Varies	, $7 to	$15		No	$10	$25	$12	$18	$25	$15
No	No	No	No	←	Yes	Yes	No	25%	No	25%	No	Yes	←	10%	Yes	?	No	Carp.	$1.75	10%	?	$20	$35	—	No	$35	$75	—	?	$35	$20
No	No	Yes	Yes	GI	Yes	Yes	No	20%	No	0–20%	No	$15	←	0%	Yes	0%	Yes	Carp.	—	—	?	?	?·	?	No	?	?	$10	Same as Col. 9	$10	?
No	No	Yes	No	←	Yes	Yes	No	25%	No	50%	No	$15-$18	←	—	No	25%	Yes	Own Men	←	—	$18	$18	$18	$18	No	Note	16	$15	Same as Col. 9	$20	$15
No	No	Som	No	←	No	Yes	No	10 & 10%	No	10 & 10%	No	Yes	←	10 & 10%	Yes	0%	No	Carp.	G.C.	←	$25	$32	—	—	No	$100	$135	Own Men	?	$10-$20	$18
No	No	No	Yes	GI	Yes	Yes	Yes	50%	Yes	50%	Yes	—	—	50%	Yes	50%	No	Carp.	—	—	←	$10 to	$20	→	—	—	—	Varies	Don't Do	—	—
No	No	No	Yes	GI	No	No	No	30%	No	30%	No	Yes	—	30%	Yes	—	No	Carp.	50c	—	$12	$18	$15	$10	No	$30	—	?	$18	$25	$20
No	No	Yes	No	←	Yes	Yes	No	20%	No	40%	No	No	$1.25 + Mat.	10%	Yes	20%	Yes	Own Men	←	?	?	$25	—	—	No	$45	—	?	—	—	—
No	No	No	No	←	No	No	No	100% on Labor +15% on Material 33⅓%	No	—	No	$ 17.50	←	15%	Yes	15%	No	Carp.	—	—	$17.50	$17.50	$15	$12-$15	No	$50	?	Est.	$16-$17	$20-$25	$17.50
No	No	Yes Non-Unio	No	←	Yes, Union No, Non-Union	No	Yes, Union No, Non-Union	50%	No	50%	No	Own	Men	—	—	—	Yes	Own Men	—	—	—	—	—	—	No	—	—	—	—	—	—
												→	75c	50%	Yes	50%	Yes	Own Men	—	50%	—	—	—	—	No	—	—	—	—	—	—
No	No	No	Yes	GI	Yes	Yes	No	15-10%	No	—	No	Yes	←	15-10%	Yes	—	No	Carp.	—	—	$25-$35	$35-$45	—	—	No	—	—	$15	?	—	—
No	No	No	Yes	GI	Yes	Yes	No	10-15%	No	15%	No	No	Time and Mat.	0%	Yes	0%	No	Carp.	$1.50 in Floor; $2.50 in wall, 1st Floor	0%	—	$18 up	—	—	No	Sold bur	with ner	—	$15, Grav. $20-$25 F.A.	$15-$25	Note 17
No	No	Yes	No	←	No	No	No	40%	No	40%	No	No	$1.25 + Mat.	40%	Yes	40%	Yes	Own Men	←	0%	—	$18	$15	$10	No	$35	$50	?	—	—	—
No	No	No	No	←	Yes	No	No	33⅓%	No	40%	No	No	$1.75	20%	Yes	33⅓%	Yes	Own Men	←	0%	$10-$15	$15-$18	—	$6	No	$25	$40	G.C.	—	—	—
No	No	No	Yes	GI	Yes	Yes	No	33⅓%	No	33⅓%	No	Yes	←	0%	Yes	0%	Yes	Own Men	←	0%	$12	—	—	—	?	?	?	10	—	—	—
No	No	Yes	Yes	GI	Yes	Yes	No	10%	No	10%	No	Yes	←	10%	Yes	10%	Yes	Carp.	—	10%	$17	$20	$32	$8	No	Varies	Varies	$12.50	—	—	—
No	No	No	Yes	GI	Yes	No	No	0-10% Note 21	No	0-10% Note 21	No	Yes Note 22	←	0%	Yes	0%	Union, Yes; Non-Union No	Carp.	G.C.	0%	$15-$25	$25-$60	$21-$28	$10-$17	No	$50-$100	$125	$15-$25	$14	$10-$30	$15-$25
No	No	Yes	No	←	Yes	Yes	No	25-40%	Yes & No	25-40%	No	No	60c	15-40%	Yes	30-40%	No	Carp.	—	—	$6-$10	$8-$10	$5-$10	$6	No	$27-$50	$50-$75	$3-$8	$20	$6 up	$2 up
No	No	No	No	←	No	No	No	25-30%	No	25-30%	No	Note 24	←	—	Yes	—	No	Carp.	G.C.	—	Own work a on new	en Do nd all houses	Old H but ou	House tlets	No	?	?	Owner	?	—	—
No	No	Yes	No	←	Yes	Yes	No	30%	No	30%	Yes	←	←	Own Men	Yes	30%	No	Own Men	←	0%	←	Own	Men	→	Yes	←	←	—	?	—	—
No	No	No	No	←	Yes	No	No	25%	No	25%	No	Yes	←	0%	Yes	0%	No	Carp.	—	0%	$7.50	—	—	—	—	—	—	Own Men	?	—	—
No	No	No	No	←	Yes	No	No	35%	No	50%	No	Yes	←	20%	Yes	0%	Yes	Own Men	—	0%	$21	—	—	—	No	$60	$100	—	?	$10	$12.50
No	No	Yes	Yes	GI	Yes	Yes	No	33⅓%	No	25%	Yes	→	$1	0%	Yes	0%	Yes	Own Men	—	0%	$5	$15	—	$4	No	$35	$45 plus hole	$5-$8	$14	—	—

Note 14—Prices quoted for tank and tank setting also includes wiring the controls.

Note 15—Low priced contractors regularly install for $15 per opening. Some use rectangular mains with round pipe branches; some do not line returns from second floor; some do not use metal boxes behind return faces.

Note 16—Reporter sells burner and controls and installs for $75 with one year service. Installer furnishes and sets tank, fittings and wiring.

Note 17—Electricians wire zone controls; heating contractor sets and wires all controls which attach to metal work.

Note 18—The Akron Code requires that air be brought back to furnace through all metal ducts.

Note 19—Canton has a graduated apprentice scale 50c first year; 60c second year; 70c third year; 80c fourth year.

Note 20—In Cleveland, as in many other cities, new house installations are union shop only; non-union shops must confine themselves to old house work. This creates a considerably higher price per opening for non-union reporters.

Note 21—Both non-union reporters figure cost of material plus labor and add 50 per cent for overhead and profit. One deducts from this 16% for salesman's commission, plus 10% for canvasser's, plus 6% for sales closers. Union shops report 0 to 10% for overhead and profit.

Note 22—Reports show $22 for gas-fired air conditioners; $27 for gas conversion burners; $60 for oil-fired air conditioners.

Note 23—One reporter states that on old house work he doubles the price per opening. Works out $20 for opening plus $6 to connect, total $26.

Note 24—In Toledo electricians recognize heating and cooling controls as a specialized field and permit heating contractors to install and wire controls. Electricians operate future service.

THE PROBLEM CORNER

Gas Furnace Condensation

American Artisan:

We have installed a large number of gas furnaces most of which had attached blowers. A common complaint is condensation of moisture on windows. We have added small volumes of outside air which cured the trouble in some cases. We have also recommended storm windows, but the customer frequently says—"We never had this condensation with coal, why should we have the expense of storm windows when we burn gas?" We can't see any reason for increased condensation when gas is burned, but perhaps you have some suggestions.

F. C. S., Ohio.

Reply by
The Editors

There should be no reason why a gas fired furnace will result in more window condensation than an oil or coal fired furnace. It is true that gas gives off more condensation in the products of combustion, but, as you can realize, these products of combustion are confined to the furnace, smoke pipe and chimney and there should be no reason why this moisture escapes into the house. We believe the greater condensation you experienced in converting a gravity system to mechanical circulation is due to the fact that with the blower you are circulating from 50 to 200 per cent more air through the furnace and, accordingly, if the humidifier is working at all, you should evaporate more water and put a higher percentage of relative humidity into the house with the blower than with the gravity circulation.

Your use of some small quantity of outside air is to be recommended. We recommend at least 10 per cent and if you have a mixing damper in this outside air duct, the home owner, with a little experience, should be able manually to adjust the percentage of outside air to increase the outside air quantity as temperatures outdoors drop. By doing so you will be admitting drier air to the furnace and accordingly should be able to reduce condensation.

We believe that you are quite right in recommending the use of storm windows on all houses because storm windows will permit you to carry a higher percentage of relative humidity without condensation; will also reduce infiltration; and will reduce the temperature of the air inside the glass surface, which should result in a more satisfactory comfort condition near the window.

◆

Stairway Registers

American Artisan:

What if anything has been the general experience of the trade with registers on stairways to alleviate the feeling of draft caused by descending cold air? How do second floor returns compare in effect with such registers? What is the best location for such a stair register?

A. W. H., Missouri.

Reply by
G. A. Voorhees
The Furblo Company.

I have had reasonably good results by placing a baseboard register at the top of the stairway as indicated in the accompanying figures 1-A and 1-B. The **best** results have been in the case of the stairway with a landing as indicated in Fig. 2.

In either case, the jet of warm air serves to "break up" the layer of very heavy cold air which is sliding down the stairway. It, of course, does not eliminate the flow of air down the stairs—merely breaks it up and "tempers" it so as to avoid complaints of a cold draft around the ankles of the occupants of the first floor room.

This is only a makeshift when it is impractical to get returns direct from the second floor rooms—but you will run into many such jobs in replacement work and this little stunt has been a lifesaver in more cases than one.

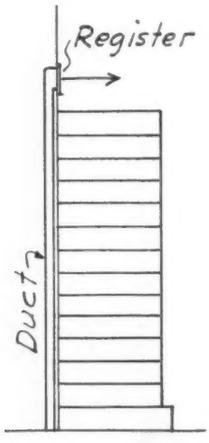


Fig. 1-A

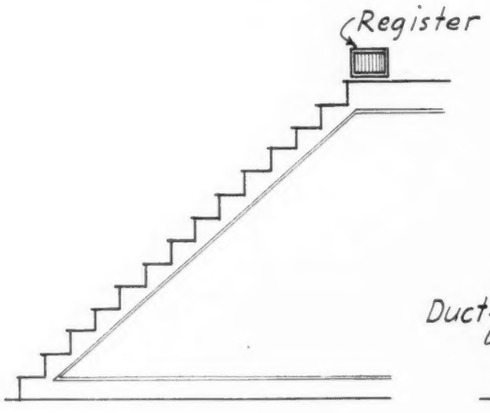


Fig. 1-B

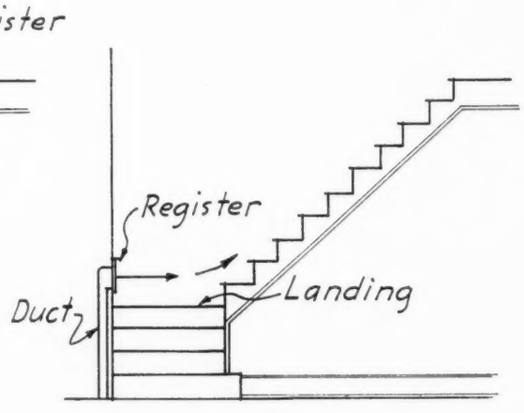


Fig. 2

ENGINEERS!

GET **Important Facts**

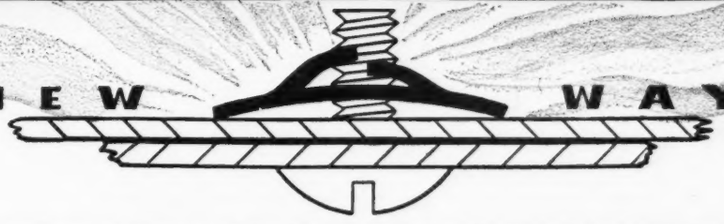
AT BOOTH
734-736
LAKESIDE HALL

ON MORE POSITIVE HOLDING POWER

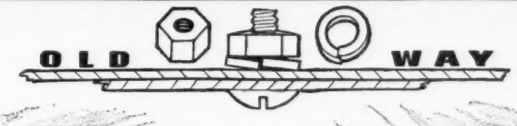
AT **50%** LOWER COSTS WITH THE

Speed Nut System

PATENTED



1 SPEED NUT REPLACES 2 PARTS (NUT AND LOCK WASHER)



One SPEED NUT always replaces at least two other parts—threaded nut and lock washer. In some cases a single **SPEED NUT** has replaced as high as five other parts.

The **SPEED NUT** System prevents loosening from vibration and assures more positive holding power.

SPEED NUTS are made for most standard sizes of machine screws, sheet metal screws, stove bolts, rivets and plastic studs. Over 300 different shapes and sizes already in use. Over 700 million already produced. If you have a difficult or peculiar assembly problem, let us help you solve it with **SPEED NUTS** and **SPEED CLIPS.**

TINNERMAN PRODUCTS, INC.

2065 Fulton Road Cleveland, Ohio

MANUFACTURERS OF PATENTED SPEED NUTS

In Canada, WALLACE BARNES CO., Ltd., Hamilton, Ontario. ● In England, SIMMONDS AEROCESSORIES, Ltd., London.

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Stokers have made a place for themselves—Americans DO want stoker-firing. . . . And they are increasingly alert and informed each year to the advantages and desirable features of the things they buy.

So many stokers are so much alike (except for the shape and color of the hopper) that when one dealer shows and DEMONSTRATES STOKER-OLA'S PATENTED GEARLESS DRIVE, and explains its advantages, prospects quickly "believe their eyes and ears"—with the natural result that

STOKER-OLA IS AMERICA'S EASIEST-SOLD STOKER

This isn't a mere claim—we have letters from dealers that PROVE it . . . letters that plainly point the way for YOU to actually MAKE 1940 "A Happy & Prosperous New Year—All Year."

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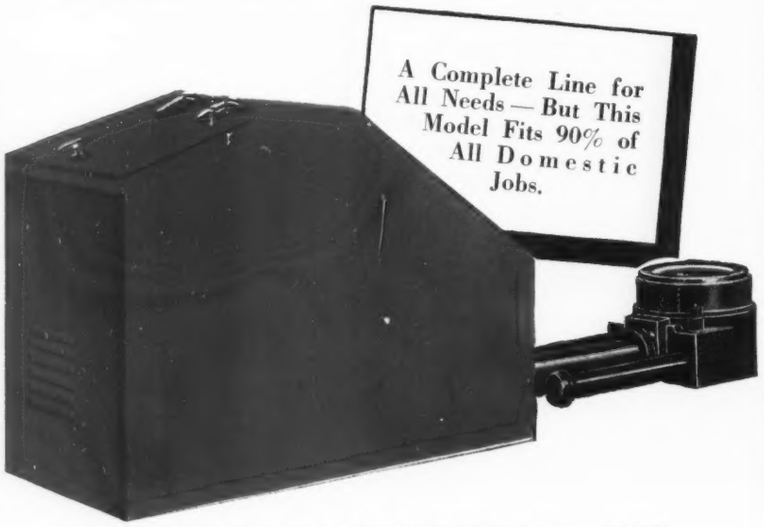
It SOUNDS logical. . . . It LOOKS logical. . . . IT IS logical.

And these other features add their force toward making STOKER-OLA dealerships PROFITABLE:

● Unlimited coal-feed control ● Only 2 major working parts ● Repulsion-induction motor of standard make ● Less current required ● Ball bearings for longer life ● Tempered cast-steel screw ● 3-year guarantee ● PERFORMANCE that adds owners to your "sales force!"



ADVANCE APPLIANCE CO., INC.

Pioneers in the Stoker Industry

808 S. Washington St. Peoria, Ill.

Send for details of our dealer proposition.

Price per Opening Is a Sound Method

(*Continued from page* 90)

By using the cost per opening selling price and the described short cut methods to determine equipment size, we could estimate forced air systems in minutes instead of hours.

Gradually word of this method of estimating spread around. The price $20.00 per opening, became standard in the Chicago area. With widespread use controversy has arisen, from time to time, as to the method's feasibility. It has been abused because its component parts are not always known. I have never defended it because it has been entirely satisfactory for my own needs. It definitely requires standardized installation practices, accurate accounting and analysis of any peculiar conditions.

P/O Must Be Based on Records

The complete information on which the price per opening method of estimating is based reveals that its component parts are extensive but allow variations to meet practically all conditions as experience dictates. This is evident from complete itemization of the items which must be known for its use:

1. Pounds of galvanized steel. (Per average opening)
2. Register
3. Miscellaneous (Damper)
4. Labor
5. Gross Profit

A. Selling Price Per Opening

6. Equipment
7. Labor to assemble and erect equipment
8. Plenums
9. Gross Profit

B. Selling Price of Equipment

C. Electrical Work

D. Special Items

Fundamentals Must Be Understood

The opening method of estimating ductwork is simple in its use. But like all formulas the factors which must be known represent analysis and experience. Quantities and qualities may be substituted in an estimating formula just as we use various factors and quantities of a structure to estimate the heat load. Poundages of iron, cost of registers and special items may be added or deducted and thus broaden its scope for old, new, remodel or any particular installation condition. In unusual cases, it may be used as a check on any method of estimating.

An incompetent can use Price per Opening, but he will rise or fall upon his degree of competency here just as surely as he will in any other phase of his business life. Judicious use and experience marks the difference between the amateur and the professional.

1,500 Winter A. C. Systems in 1939

(*Continued from page 87*)

all the roughing-in work, set boxes, run stacks, or, on a bungalow, place short stubs to boxes. They also rough in the low voltage thermostat wire. This is all they do.

The second crew (two men) install all basement duct work. The duct sections (assembled and numbered) are delivered by the company's truck. This crew makes two trips. On the first trip they install only the basement piping. Before their second trip the unit has been set and on their second trip they install the straight-up plenum and connect the duct work to the unit.

The third crew (two men) install the unit. They haul the unit to the job in their own truck, place the unit on a special concrete foundation which they build. If the furnace is gas fired this crew makes the pipe connection to the meter; if oil fired they set tank, connect same and put on fill and vent lines. This is all they do.

The fourth crew (one man) places register and return faces. He does nothing else.

The fifth crew (two men) spray paint the duct work and clean up the job. They clean up debris left by other crews, clean up the unit. They also install the thermostat and the humidifier. It is the responsibility of this crew to see that all work is done and satisfactory before leaving the job.

The sixth crew (one man) is the electrician. He connects up all controls, humidifier and humidistat, also thermostat, runs line voltage if any and starts the unit to see that everything is in working order.

Checking and Balancing System

The installation now ready, the service department calls and starts the system. By register air volume, using the dampers behind the registers the system is balanced up—usually a twenty minute job for our "average" house. The plan prepared by the engineering department gives the cfm for each register and the system is balanced to deliver this quantity of air. At this time the service man also checks the input and makes proper adjustments for that particular job. The service department also does all service work during the year included in the unconditional guarantee.

Mechanic's Income

Most of the two-men crews described consist of a mechanic and a helper. All men in the crews are paid on a unit basis (see Pay Voucher sheet) so much for this operation, so much for that operation. Given a choice of unit price or hourly wage the mechanics have expressed a preference for the unit pay. From company records these unit prices have been worked out so that a good mechanic can make $1.00 to $1.50 per hour and the helper can make $.50 to $.75 per hour. The unit prices were established from cost records covering many jobs and

H&C

POPULARLY PRICED DAMPER REGULATOR SET

NOW OFFERED WITH SNAP END BEARING

.... At 32c (List Price)

The No. 40¼S Set shown at the right is identical with our popular No. 40¼ Damper Regulator Set except that No. 40¼S is furnished with H & C Snap End Bearing which permits installation of even the smallest dampers without bending. However, No. 40¼S Set does not displace the No. 40¼ Set which has a solid end bearing. List Price of No. 40¼S Set is 32c; List Price of No. 40¼ Set is 30c.

No. 40¼S Complete Set (¼" Bearings)

Both are quality-built, economical sets assuring quick and secure installations. Both are furnished with a wing and a hexagonal nut for installation in any one of three ways. Equally adaptable to round or square ducts, splitter or regular dampers. All parts are rust-proofed. For economical, quality-built damper regulator sets, ask your Jobber about No. 40¼ and No. 40¼S Sets.

HART & COOLEY MANUFACTURING CO., Holland, Mich.—Chicago, 61 W. Kinzie St.

CUT IRREGULAR SHEET METAL SHAPES AT LOWER COST

with a

CAMPBELL NIBBLER

CAMPBELL NIBBLER NO. 1B

● Cut irregular shapes in steel or other commercial materials up to one-half inch thick in less time and with greater economy and accuracy than by any other method. Some users report that the Campbell Nibbling Machine has reduced cutting costs as much as 80%.

Campbell Nibbling Machines do not distort or case harden materials. They do not set up internal strains or cause invisible fractures. Little or no finishing is required, because no burrs are left at edges.

On short runs the Campbell Nibbling Machine eliminates the cost of dies.

BUY ACCO QUALITY *in Campbell Cutting Machines; Wright Hoists, Cranes and Trolleys; Page Welding Electrodes; Page Wire Fence; American Chains; Tru-Lay Preformed Wire Rope; Reading-Pratt & Cady Valves.*

ANDREW C. CAMPBELL DIVISION
DESIGNERS AND BUILDERS OF SPECIAL MACHINERY
BRIDGEPORT, CONNECTICUT

ACCO TRADE MARK

AMERICAN CHAIN & CABLE COMPANY, Inc.
In Business for Your Safety

were set to give an incentive for speedy, but quality, workmanship.

As stated, all duct work is delivered to the job as complete and identified sections. The duct work is made in the shop where two crews work most of the year. Each crew works 10 to 12 hours per shift depending upon volume. The shop men are paid on an hourly wage basis.

Because each job is handled by so many crews it naturally results that all these crews, each doing a different operation and covering as large an area as greater Detroit, must be under the minute-to-minute supervision of some central authority. This is the Dispatcher. He sees to it that each operation is taken care of at exactly the right time, by the right crew; that materials are on the job when the men get there, that no crew has time to waste or time to be idle, that each step of each job is on schedule. His is a real job and the key to the efficient operation of the entire installing organization.

Boyd-Cooper Heating Co.

14471 LIVERNOIS AVE.
UNiversity 2-6500

Our Serviceman called today at____ and found no one at home. Please call again for service.

Date_____

_____
Serviceman

The service man's card is left on the door handle if he finds no one at home. This is thought important because it shows that an effort was made to give prompt service. The owner then calls the dispatcher to make a definite appointment for another call.

Boyd-Cooper did not reach this efficiency of organization in a single bound. The firm was organized by the two men whose name the company bears in 1932. E. L. Boyd bought out F. G. Cooper

PRESCRIPTION FOR PROFITS

ORDER your M-VB Humidifier Valves now

TAKE but thirty minutes installing one

MAKE a Contented Customer and a Pretty Profit

There's an M-VB Humidifier Valve to suit every warm air furnace. And every one of these top-notch M-VB products has what it takes to make your cash register sing.

Customer Appeal

M-VB Humidifier Valves mean less fuel burned for comfortable temperatures and healthy, humidified air.

Built to prevent corrosive matter from reaching working parts, they're bears for long, efficient service life.

Quickly and conveniently installed. No need to drop fire.

Priced so low that fuel savings alone write off cost quickly.

Dealer Appeal

M-VB Humidifier Valves sell quickly. Your time is money to you.

Thirty minutes is enough to install one. More jobs handled per day means more profit for you.

No profit-less "call backs" for service once installed. M-VB products do their jobs for keeps.

GET IN TOUCH WITH YOUR WHOLESALER OR M-VB RIGHT AWAY. YOU CAN'T PICK UP THE PROFITS 'TIL YOU'VE GOT THE GOODS. Get full information and sales-starting free leaflets for your customers. Take one of these humidifier valves along on every job—it's about the easiest money in sight.

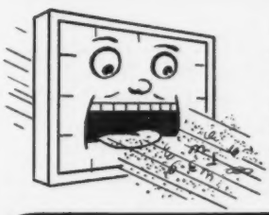
M-VB

MORENCY-VAN BUREN DIVISION
SCOVILL MANUFACTURING CO.
Sturgis, Michigan

SCOVILL SAVES YOU TIME IN SELLING—TIME IN INSTALLING

Complete lines of water closet tank fittings and humidifier stocks also maintained at Waterville, Connecticut and San Francisco

DON'T TAKE OUR WORD FOR IT . . . TEST AXIOM AIR FILTERS YOURSELF

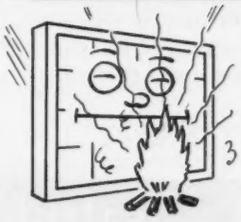


AXIOM FILTERS TRAP AND HOLD ALL DIRT

Practically all of the dust, dirt, bacteria and pollen is caught and held by Axioms, not just part of it, as is the case with ordinary filters.

AXIOM FILTERS ARE OUTSTANDING VALUES

Tests made by national authorities show Axiom tops the six other leading air filters in initial resistance and overall efficiency.

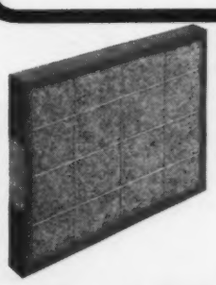


AXIOM FILTERS ARE FLAME-PROOF

Axioms are flame-proofed to the extent that they will not contribute to spread of fire from outside, or from combustible material lodged within.

FILTERS THRU CACTUS FIBRES AND HAIR

Special curled cactus fibre and thousands of kinky, oil-coated hairs constitute the scientific method Axiom uses to cleanse and purify the air.



★ FURNACE AND AIR CONDITIONING MANUFACTURERS

SEND IN TRIAL ORDER TODAY.

AXIOM REPLACEMENT •TYPE• AIR FILTER

DIVISION

BLOCKSOM & COMPANY
MICHIGAN CITY, INDIANA, U. S. A.

Please send me complete information on tests and prices of the amazing Axiom Air Filter.

Name .....

Firm ..... Address .....

City ..... State .....

and later B. J. Tremayne bought a half interest. The firm was incorporated about two years ago. The first work of the company was a maintenance shop for heating repairs for banks, trust companies, etc. During the third and fourth years of existence, the company fabricated and installed duct work for air conditioning sales agencies. From this the present business was built year by year.

At the present time Boyd-Cooper is state of Michigan distributors for Bard heating equipment and has a separate department (see organization chart) to cooperate with dealers. It is a policy of this department to give to any dealer all the information necessary to adopt the Boyd-Cooper organization ideas to his own particular needs. Boyd-Cooper are also metropolitan distributor for Frigidaire Corp. air conditioning equipment. The company also sells Stok-a-Fire stokers and Vernois gravity furnaces.

◆

Simplification Reduces Duct Costs

(*Continued from page* 114)

shoulder turned all around an inch from the end. This appears in the picture. To connect stack to trunk the hole is cut, the stub pushed down (the flange lets the stub go down only an inch) and the bottom sides of the stub are turned up in the trunk. This speeds connection.

Branch and trunk take-offs are standardized in size as much as possible and one series of pictures show a fitting being constructed. The small scratch template shown marks the metal for edging in the bar folder and in the edging machine. Take-off sides are Pittsburgh seamed, then passed through a hand roll and assembled in a few minutes.

Takeoffs and Plenums

The foundation on which this method of duct fabrication is based, obviously, is the Pittsburgh lock forming machine. By keeping to standard 8-inch deep ducts as much as possible, with the standard sides taking the Pittsburgh which formerly required much time, duct sections have become a matter of minutes instead of half-hours formerly required.

Wherever possible, straight-up plenums are used. To build a standard plenum, the flat top and the two narrowest sides are cut from one sheet, notched for the two upper corners, and put through the Pittsburgh machine. The other two faces are singles, edged for the Pittsburgh. Trunks are taken straight out of the plenum.

These efforts at simplification of the various steps involved in designing and installing a heating system have reduced costs. These reduced costs, in turn, have enabled Midwest to offer their clients high quality systems, correctly engineered and fabricated, at prices which make completely new duct systems for old furnaces and engineered duct-work on new systems attractive to the client who wants quality at a fair price.

Healthful Comfortable Heating *with the*

CASH-IN on the Demand for

CHAMBERLIN AUTOMATIC HUMIDIFIER

- **Easy to Sell and Install**
- **Automatic Operation**

IN every home where the furnace has only a conventional water pan for humidification, you have a prospective customer for the famous, moderately priced Chamberlin Automatic Humidifier. Hundreds of alert dealers are taking advantage of this. They are using the Chamberlin to boost sales and profits.

It's easy to show your customers that automatically controlled, scientifically correct humidification gives them heating economy . . . greater comfort . . . added health protection at low cost.

Add to this the Chamberlin QUALITY and TROUBLE-FREE PERFORMANCE and increased sales come surprisingly easy.

Large water way through the trap assures free flow without liming. The integrally cast trap keeps heated water from circulating into the float pan to cause lime. Positive action valve is entirely out of the water.

Exclusive Features Assure Extra Value

The Chamberlin Automatic Humidifier is cast entirely in one-piece with durable baked enamel finish. Outstanding for automatically fired furnaces because heavy cast iron holds heat longer—gives more humidification between firing periods. Fits any furnace hood. Can be quickly installed even while furnace is operating. Vapor pan is 3" deep but carries only 1" of water to assure rapid evaporation. Fully automatic. Shipped complete as shown, ready to install.

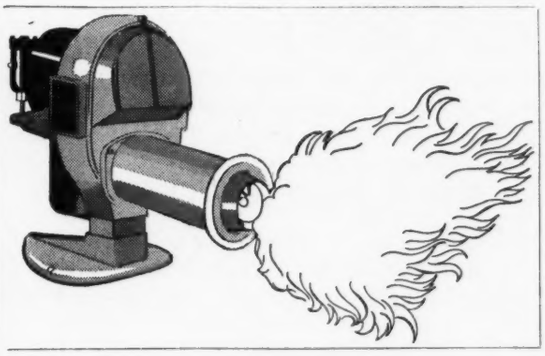
Don't pass up sales opportunities. Write today for Free literature and full details on the Chamberlin Automatic Humidifier. Successfully manufactured and distributed from coast-to-coast for over 14 years.

MANUFACTURED BY
CHANDLER COMPANY CEDAR RAPIDS, IOWA

HOW ONE DEALER GOT

OUT OF THE RED . . .

The FIRST Time in 4 Years *



Here's Proof . . . By November ('39) this dealer wiped out all losses of '36, '37 and '38 . . . and for the first time was using BLACK INK.

NOTICE 80 installations were made through November '39 (all types) and that 40 were Beckett COMMODORE oil burners. A glance at the chart proves that COMMODORE sales was the solution.
*In a town 25,000 population.

Type of Sales	*Sales by Years*			
	1936	1937	1938	1939
GRAVITY	52	41	25	29
STOKERS	3	2	1	0
Beckett COMMODORE Oil Burner	**0**	**1**	**7**	**40**
AIR CONDITIONING	18	22	12	11
TOTAL SALES	73	66	45	80†

†To End of Nov. Only

See the

22 DISTINCTIVE FEATURES

of Beckett

COMMODORE

at BOOTH 725

Cleveland Jan. 22-26

International Heating and Ventilating Exposition

OR WRITE FOR DETAILS

R. W. BECKETT ENGINEERING COMPANY,

Manufacturers "Beckett COMMODORE" Products

ELYRIA, OHIO

Elgo Ventilating Specialties

A Shutter With Unusual Features .

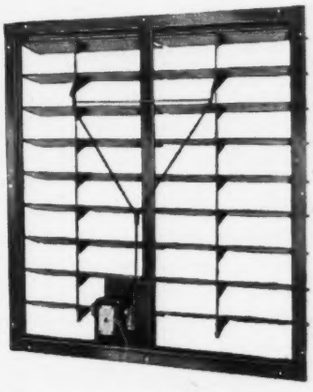
Tightest Fitting Shutter on the Market

(1) Louvres weatherstripped on inner edge, instead of on outer edge, making shutters open more easily and fit more snugly. Tightest fitting shutter on the market.

(2) Swivel-joint with hardened steel bushing. No wear or rattle. Good for the life of the shutter.

More sensitive than any other automatic shutter, and longer lasting. Built to any size, square or rectangular.

All-Steel Motorized Shutter



Used for exhaust ventilation in industrial, commercial and residential buildings. Automatically controlled by fan switch. Six-second opening. Positive closing. Storm-proof. All-steel construction.

Elgo Shutters are distributed through fan and air conditioning equipment manufacturers.

Elgo Shutter & Manufacturing Co.

634 W. WARREN DETROIT, MICH.

Elgo Shutter & Mfg. Co.
634 W. Warren, Detroit, Mich.

Free CATALOG

Please send catalog showing the items checked below:

Automatic Shutters
Stationary Shutters
Hand Operated Shutters
Ceiling Dampers
Balanced Vent Units
Motorized Shutters

Name .....

Address .....

City ..... State .....

THERE'S A HESS FURNACE FOR EVERY TYPE OF FUEL

The HESS Line is complete, including welded steel furnaces up to one million B.t.u. capacity, blower filter units, oil and gas burners, stokers, and all accessories for complete installations.

The HESS Franchise offers you one reliable source of supply with a background of 66 years of successful experience, real territory protection, and effective advertising materials.

The new HESS Gas Furnaces, gravity and forced air styles, come rated from 48,000 B.T.U. up to 200,000 B.T.U.

Write for 1940 Dealer Portfolio.

HESS WARMING AND VENTILATING CO. 1211-27 S. WESTERN AVE. CHICAGO, ILL.
Established 1873

115 Tons of Iron —Every Pound Interesting

(Continued from page 108)

galvanized iron standing seam "S" and drive cleats across the top and bottom in addition to the structural angles every four feet and, also, that these angles at 4-foot intervals go completely around the duct. All angles are riveted to the duct—there is not one metal screw in the duct work. Also, the cross angles lap over the vertical side angles and are riveted together.

The main duct work was made up in 8-foot lengths with the angles riveted about 2 feet from each end. Branch pipes were made up in 8-foot lengths.

10,000 Hanger Holes

There are some interesting data on the hangers. As the detail shows, each hanger angle is fastened to the concrete ceiling with two 5/16 and ⅜-inch bolts run into Phillips shells. It was found after work began, that because of irregularities in the concrete ceiling, hanger angles varied as much as ¾ to 1¼ inches in length so instead of shipping hanger angles cut to length ready for the mechanics, every hanger angle on the job had to be individually measured, cut and punched on the job. Also because of the use of two bolts to each hanger angle, some 10,000 holes had to be made in the concrete. To facilitate this tedious operation, the Phillips drill (which uses the shell as the drilling bit) was used and the operator became so proficient that one hole every minute was obtained without killing the mechanic. All duct work was erected from movable iron horses.

The installation contains many progressive details. For example, the fire stops used at floor levels in the riser shafts. A detail shows the construction with the ducts supported by riveted-on angle iron. Where ducts and angles did not completely fill the shaft, a 10 gauge plate was cut to fill the opening. This cuts off all possible up-draft through openings in the shaft and is a definite fire-prevention measure.

Splitters, Dampers, Etc.

The details show a number of features in the air distribution system. In addition to the 180-degree elbows the connecting "Y's" are equipped with deflectors so that air flow is uniform across the full face of the grille, no matter what fittings are ahead of the opening. Where the branch leaves the main, a splitter is installed as shown and, because the takeoff is behind the ceiling some means had to be provided to balance air flow and make any future changes in air quantities. To obtain this adjustment, the splitter quadrant shown was designed by the engineers of the Chicago Park District and developed by the Haines Company. The square damper shaft is inserted in the hollow square rod which is threaded for a lock washer and nut and a position indicator. The complete assembly is flush with the ceiling and the only visible part is the cover plate.

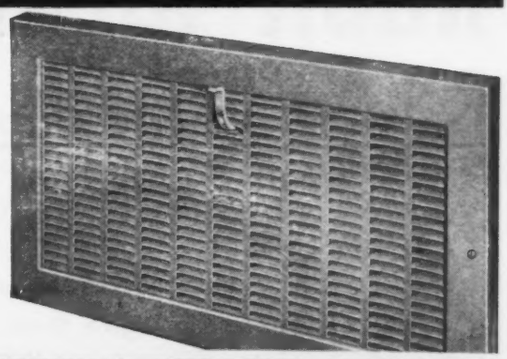
Other details show method of applying duct insulation, damper control rods for exposed ducts,

CHAR-GALE "Seal-Tite" REGISTER

Eliminates Wall Streaking!

The CHAR-GALE "Seal-Tite" REGISTER is completely and permanently streak-proof. It pleases your customers, saves your time and cuts installation costs. Our exclusive flexible packing member is an integral part of the back frame—requires no sealing frames when roughing in. Handsome in appearance—maximum capacity—air flow directed for comfort without drafts. Baseboard and sidewall types.

Get Our New Low 1940 Prices!



CHAR-GALE "Pre-Fabricated" DUCTS AND FITTINGS

Make You EXTRA PROFITS

CHAR-GALE "Pre-Fabricated" DUCTS and FITTINGS handle up to 95% of your jobs complete. Made by standardized mass production methods—all sizes are accurate—no delays on the job. Our "Quick-Method" Estimating Chart figures your costs and helps you engineer your job.

See Our Exhibit—BOOTH 738

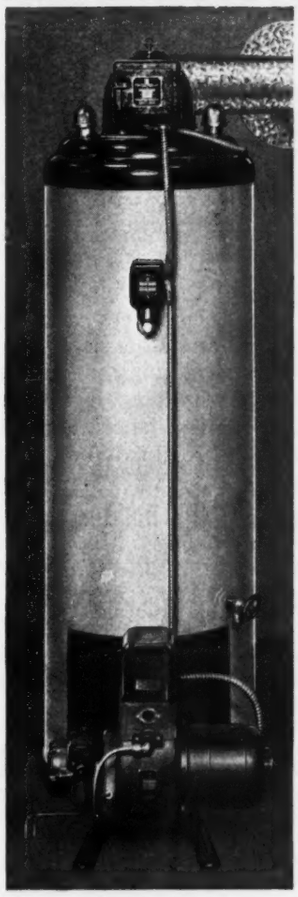
showing our complete line of

Smoke Pipe and Elbows
Superblue Stove Pipe and Elbows
Gas Draft Diverters
Warm Air Heating Specialties
Tin and Galvanized Furnace Fittings and Supplies

6th International Heating & Ventilating Exposition, Cleveland, Jan. 22-26, 1940

WRITE FOR CATALOG and give us your jobber's name and address.

CHAR-GALE MANUFACTURING CO. 3125 HIAWATHA AVE. MINNEAPOLIS, MINN.



AQULUX

New Oil-Burning, Water Heating Units

COMPACT · ECONOMICAL · BEAUTIFUL

Equipped with Johnson "BANKHEAT" Pressure Type burner, they are ideal equipment for home or apartment house.

DIMENSIONS: **"85"**—outside diameter, 20"; height, 63"; water content, 37 gallons; 85,000 b. t. u. output or recovery capacity of 100 gallons per hour at recovery capacity of 100 gallons per hour at 100 deg. temperature. **"150"**—for larger homes or apartments; water content, 45 gallons; 150,000 b. t. u. output. Write for folder. Burns No. 3 C. S. G. fuel or Diesel oil.

Oil Burners for every purpose, home or industrial; boiler-burner units and air-conditioning equipment.

Worthwhile territories and franchises available to aggressive dealers anxious to serve their communities with a complete line. Write today, giving details on qualifications.

S. T. JOHNSON CO.

940 ARLINGTON, OAKLAND, CALIFORNIA
401 N. BROAD STREET, PHILADELPHIA, PA.

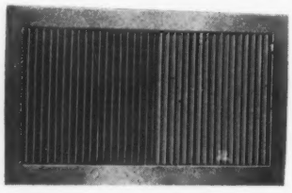
MEMBER OBI OIL BURNER INSTITUTE

SEE THE AQULUX IN OPERATION AT THE CLEVELAND SHOW

ROCK ISLAND
REGISTERS

THERE are Rock Island Registers for any installation, large or small and elaborate or plain. Utility, efficiency and durability, as well as easy installation, give these registers the extra touch to make your installations tops.

Check the popular styles listed below and then send us the coupon at once for a free catalog containing information about the complete line.



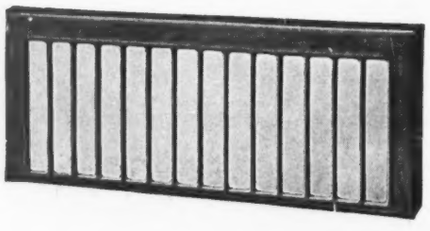
AIR-VANE REGISTERS, FACES AND GRILLES

Forced Circulation Registers. Adjustable flow right or left. Also horizontal or vertical in wall or base types, all sizes.

FORCED-AIR ONE-PIECE REGISTER

Stack Head Sizes from 10x4 to 30x8. All attractive designs with large capacities, moderately priced.

FORCED AIR BASEBOARD RETURN AIR OR GRILLE FACE



MAIL COUPON TODAY!

ROCK ISLAND REGISTER CO.
Rock Island, Ill.

Mail me a copy of your catalogue and dealer's net estimating book.

Name .....

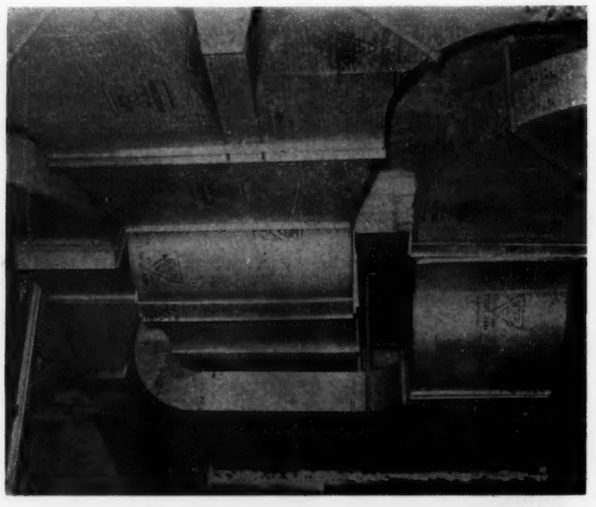
Street Address .....

City & State .....

application of grilles and the grille friction dampers, fan and motor bases, etc.

The booster fan rooms have little waste space. The equipment and the ducts in these rooms was set before the room partitions were built. Each room has two levels. On one level are the fans for the booster fan room floor; on the other level are the fans for the floor below. The fan room layout shows how the air from these fans is conducted to the corridors on the same floor or to the floor below.

Duct sizes range from very large to quite small. The large risers were fabricated as individual sheets with angles and seams formed and applied in the



Photograph of duct work in a booster fan room illustrating the duct construction and reinforcing, hanger angles and expansion bolts and the excellent sheet metal work.

shop and assembled on the job. On these risers standing seams (on the inside) were used.

Much might be written to describe these details, but the sketches shown tell the story of each feature quicker and in more complete detail. The details reproduced are typical of other similar portions of the system.

The building was designed by the Chicago Park District's own architects and engineers with the architectural firm of Holabird and Root as consultants. The heating, ventilating and air conditioning system was designed by the engineering department of the Chicago Park District in collaboration with the mechanical department of Holabird and Root.

◆

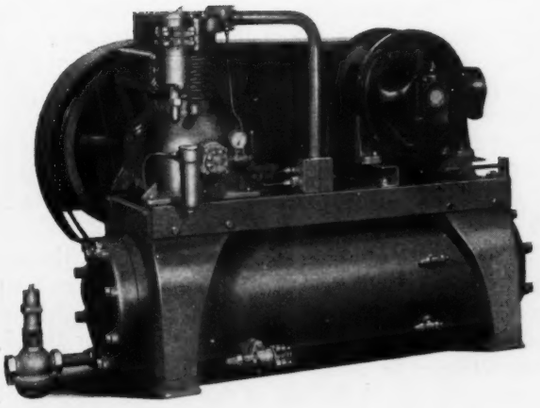
The Apprentice and the Builder

The Construction Industries Committee of the Los Angeles Chamber of Commerce has compiled data on apprenticeship training in order that building contractors may have pertinent information about this problem.

Two booklets have been printed—one, "Craftsmen of Tomorrow," and "The Apprentice and the Builder." This latter booklet gives in detail the information concerning apprentice training, and is available upon request.

"The Committee is desirous that every employer become fully informed on apprenticeship. A serious personnel problem confronts the construction industry. Unless employers take an interest in and plan for the employment of apprentices who will work under a definite training program, we may find it difficult in the future to secure expert craftsmen."—Los Angeles Chamber of Commerce, Earl S. Anderson, Secretary, Construction Industries Committee.

UNIVERSAL COOLER CONDENSING UNITS



Offering
DEFINITE ADVANTAGES

To Manufacturers

Who require refrigerating machines to supplement or complete their line—we offer 18 years of manufacturing experience—a unique sales policy: selling to manufacturers only—a complete line for standard and special application. Our past and present record is incontestable reference.

To Architects and Engineers

Complete descriptive matter with capacity and performance data will be mailed to you promptly—valuable authentic information to use for your own plans and specifications.

To Contractors

You can obtain these recognized refrigerating machines through many national manufacturers of air conditioning and refrigerating equipment. Write us for complete data.

Complete Information on Request

UNIVERSAL COOLER CORP.

Automatic Refrigeration Exclusively Since 1922

DETROIT, MICHIGAN

In Canada: Universal Cooler Co. of Canada, Ltd. Brantford, Ontario

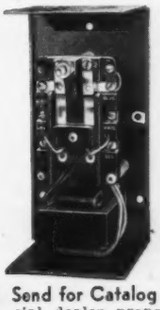
Specify G-A
Temperature Controls for 1940

● *New Types* ● *More Improvements*
● *Low Prices*

Complete with all accessories, the No. 118 *G-A Temperature Control System includes G-A single thermostat and G-A control motor. For* 110 *volt,* 60 *cycle A.C. (other voltages and frequencies available). List price* $19.00.

You can sell and recommend G-A Temperature Controls in absolute confidence—for G-A Controls are superior at every point . . . performance, quality, engineering, selling features and *price* . . . facts that have been proved by years of hard usage in thousands of installations. Contractors and heating engineers recommend them for *trouble-free* performahce, long service and utmost safety.

By recommending G-A Temperature Controls you and your customers benefit by the assurance of economical, efficient, care-free performance. Check G-A Controls yourself, check their design and construction, their exclusive features, and you'll find reliability built into every detail. And best of all G-A Controls are easier to sell—give you A GREATER MARGIN OF PROFIT.



New G-A Universal Relay

Operates with any low voltage thermostat . . . two and three wire . . . and series "10" and "20." Eliminates the need for you to carry 4 or 5 DIFFERENT types of relays for EACH type thermostat. List Price $7.00.

● **Send for Catalog and NEW Price List** Write today for special dealer proposition. NEW price list and catalog of the complete G-A line—**including control motors, limit switches, relays, time switches, stoker controls, etc.,** as well as the names of your nearest jobber.

DISTRICT REPRESENTATIVES

The H. M. Flemming Co., Inc.
30 Church Street
New York City

Smith & Dale
457 Stuart Street
Boston, Massachusetts

Mr. Floyd T. Whitney
5736—12th Street
Detroit, Michigan

Mr. Fred W. Forward
520 West Boulevard
Elkhart, Indiana

Anderson & Pelletier
67 Carlton Street
Toronto, Ontario

GLEASON-AVERY, Inc.

16 Clark Street **Auburn, New York**

Minneapolis Under Its Code

(*Continued from page* 165)

mechanics and do a pretty good job keeping their best men working most of the year.

Are Contractors Satisfied?

As far as the building department can judge, contractors are satisfied with the code. The code has not simplified management problems, but benefits seemingly outweigh disadvantages. Under the code this is the procedure. Assume that a heating installation is up for a new house built by a general contractor for the owner.

Securing Permit and OK

The owner wants a mechanical, winter air conditioning system with an automatic firing device. The contractor or contractors prepare a layout of the installation. The building department permits a single line drawing, showing pipe sizes in round or rectangular sizes. The plan must be accompanied by a completely filled-in heat loss sheet which is a standard form furnished. The contractor then brings his plan and heat loss sheet to the building department and applies for a permit for a mechanical warm air furnace unit with an oil burner, stoker or gas burner.

The plan and heat loss sheet are examined by an engineer and if approved the necessary permits are granted. If changes are needed the contractor is informed and the permit is held up waiting the changes. Quite naturally, as a result of years of experience, we know that some contractor's plans and heat loss sheets require little checking; others have to be examined carefully, either because the contractor makes mistakes; uses poor judgment; or tries to beat the code.

Approval granted, the contractor cuts his openings, sets his register boxes, runs his stacks to the basement and calls for the preliminary inspection. The inspector takes the plan, the heat loss sheet and copies of permits granted and inspects the work. The inspector examines the house to see that walls, ceilings, roof, etc., are according to the plans and checks the heat loss against construction and room sizes. If everything checks the inspector places a "roughing in" inspection tag.

Incidentally, the department has built up a list of furnaces rated according to our own formula and this list is used to see that the furnace will produce the required heat output.

As soon as possible, the furnace is set, the basement pipes are run, the registers and grilles attached, the unit is hooked up electrically and made ready to run and the contractor calls for the final inspection. If the inspector finds everything according to the code and to the plans, the permit is approved and is so entered upon the department records. It might be well to add at this point that before a new building can be legally occupied, the owner thereof must secure from the Department

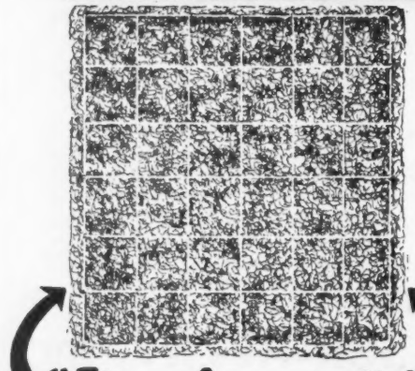
The WILSON Edge Seal Air Filter is now FLAMEPROOF—*it's been tested!*

- No costly "leaks around edges"
- No extra parts to fit
- No extra adjustments

(All ready to put in frame)

- Will not support combustion
- No flying embers down ducts
- Self sealing
- Low maintenance cost

(PROTECTED BY U. S. PATENT NO. 2138736)



"It springs to fit"

Shows how expansion extended edges of filter pad, pressed tightly against holder frame, stops leakage, decreases resistance and increases filtration area 20%.

WRITE FOR DESCRIPTIVE BULLETIN

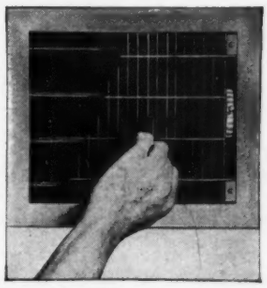
AIR FILTER DIVISION — WILSON & CO. CHICAGO — 4100 S. ASHLAND AVE.

NAME_____

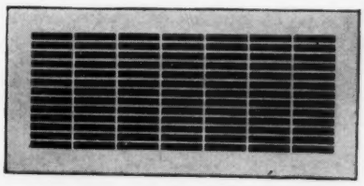
ADDRESS_____

CITY_____ STATE_____

The "AIR-CON"—Air Control



Finger-Tip Air Control by changing degree of same register

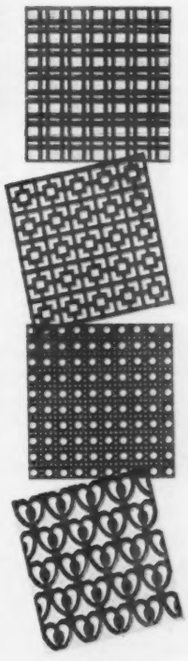


No. 20 Sidewall Grille—Large Open Area

Ornamental Perforated Grilles

WRITE FOR CATALOG

REGISTERS • GRILLES *and* INDUSTRIAL SCREENS



Registers, grilles or industrial screens from Standard Stamping & Perforating Company carry with them the guarantee of perfect performance and durability. Quality construction throughout assures dealers and manufacturers of installations and applications that will be modern and efficient to the minutest detail.

Architects, building contractors, air conditioning engineers and ornamental iron workers or fabricators will find our registers and grilles modernize old installations and are the last word in a modern, up-to-date job where appearance and performance are of prime importance.

Users of industrial screenings will find our line to be unusually varied and the fine assortment of faces and perforations will afford a grille or screen for every application.

Write TODAY for our new, big catalog containing complete information on the entire line.

WE ALSO FURNISH CAST GRILLES INDUSTRIAL SCREENS

STANDARD STAMPING & PERFORATING CO.

3131 WEST 49TH ST. CHICAGO, ILL.

W. A. WHITNEY MFG. COMPANY

636 RACE STREET **ROCKFORD, ILLINOIS**

Look for this mark when buying

NO. 1 HEAVY DUTY PUNCH

Length 34", weight 22 lbs., well distributed to nicely balance the tool. Capacity ⅜" hole through ¼" iron. Heavily reinforced for strains. Punches and dies ⅛" to ⅞" by ⅞". Insertable Pipe Handles.

CHANNEL IRON PUNCH

Every part of this Punch is interchangeable with the No. 2. Length 23", weight 16½ lbs. Depth of throat 1⅞". Capacity ¼" through ¼" iron. Punches and dies ⅜" to ½" by ⅞".

NO. 6 FLANGE PUNCH

Punches within ⅜" of inside corner of Angle Iron. Capacity ¼" through ⅝" iron. Depth of throat 1¾", throat opening width ⅛" above die top. Punches and dies ⅛" to ⅜" by ⅜". Especially adapted for Button Punching. Weight—10 lbs.

Channel Iron 2½" Flange x ¼" Web.

Angle Iron 2½" x 2½" x ¼".

NO. 91 BENCH PUNCH

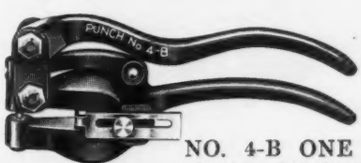
Capacity ½" hole through ¼" iron, ¾" hole through ⅛" iron, 2" hole through ⅛" iron. Weight 82 lbs. Depth of throat 5". Stock size of punches and dies ⅛" to 2".

EXTRA PUNCHES *and* DIES

Prompt shipments can be made of any size or any quantity of both types of extra punches and dies as here shown.

NO. 2 PUNCH

Length 23". Capacity ⅛" through ¼" iron, weight 13 lbs., depth of throat 1⅛". Punches and dies ⅛" to ½" by ⅞".



NO. 4-B ONE HAND PUNCH

Length 8½". Capacity ¼" through 16 gauge iron. Weight 3 lbs. Depth of throat 2". Punches and dies ⅛" to ½" by ⅞".

NO. 8-B PUNCH

Capacity ¼" hole through ⅛" iron. Length 18½", weight 7½ lbs. Depth of throat 2". Stock size of punches ⅛" to ⅞" by ⅞".

GOOD NEWS
for the WARM AIR MAN
whose customers need HOT WATER

PENNGUN

— the tankless hot water heater for every domestic purpose — is your "in" to handsome, extra profits . . .

PENNGUN licks domestic hot water costs for your customers.

PENNGUN is the ideal water heater for homes with air conditioning or warm air furnaces.

PENNGUN is modern, compact, beautiful — fits in any basement.

PENNGUN comes to you as a complete unit — tested and assembled in our factory. All you do is connect the supply lines — oil, electric, water.

PENNGUN costs you less to install, gives you a healthier profit, has no service headaches.

LOOK AT PENNGUN'S REVOLUTIONARY DESIGN!

You can see for yourself why we say Penngun's new water heating method is a revolutionary application of a time-tested principle. See how heater water circulates around the patented backward-and-forward fire travel, rapidly becomes reheated, then *indirectly* heats domestic hot water in corrosion-free copper coil. PENNGUN is capable of delivering all the hot water your customers can use—as much as 200 gallons per hour. No scaling or rusting of heater walls to worry about. No extra tank required. Uses 2 or 3 oil. Plenty of hot water 24 hours a day for your customers—plenty of profits for you.

PENNGUN will be on display for the first time at the Cleveland show. If you can't get to the show, write for information and complete details on this money-making domestic hot water unit.

PENN BOILER & BURNER MFG. CORP.
LANCASTER, PENNA. • PROVIDENCE, R. I.

Manufacturers of Burners, Boilers, Domestic Water Heating Units and the Famous PENN AIR CONDITIONER

PENN BOILER & BURNER MFG. CORP.
Lancaster, Pa.

Gentlemen:

☐ I am interested in making extra profits with PENNGUN, the Domestic Hot Water Heater.

☐ I am also interested in knowing more about the famous PENN Automatic Winter Air Conditioner.

Name .....

Address .....

City ..... *State* .....

of Buildings a "Certificate of Occupancy" which, in effect, means that the various component parts of such building, including plumbing, heating, electric wiring, etc., comply with the provisions of the various ordinances affecting such parts and show by such compliance that the building is approved for occupancy. Should a heating installation prove unsatisfactory in any way the owner can place a complaint with the building department and it is up to us to find what is wrong. It is up to the contractor, then, to remedy the work according to our recommendations.

Financing

Since the first gravity ordinance, our code has been self-supporting. It has even shown a substantial profit and shows a small profit when the salaries, expenses, office expense are charged against the department. All license and inspection fees go

APPLICATION FOR STOKER PERMIT

Permit No. O 5619

Location 1864 Mentota Place

John E. Nelson
~~LOUIS CLOUSING~~, Minneapolis, Minn. Oct. 2 1939

Inspector of Buildings:

The undersigned hereby makes application for a permit for the work herein specified, agreeing to do all such work in strict accordance with the City ordinances and rulings of the Department of Buildings.

Owner Henry Smith

Kind of Building Brick *Used as* Apt.

To be begun about Oct. 4 1939

To be completed about Oct. 6 1939

Estimated Cost, $ 460 00

Old-New Building Application No.

Electrical Permit No.

DESCRIPTION OF WORK

Note: Insert the word, install, add, alter, or repair, according to which is to be done. Under "Remarks," itemize removals, if any, and alterations to equipment.

Install 1 Stokers: Trade Name Coal Burner

Size No. 75 T Feed rate 75 lbs. per hr.

Type Underfeed Grate area 14 sq. ft.

Setting Pit Controls auto.

Boiler or furnace

Remarks:

Signed Minneapolis Stoker Co. Licensee.

By John Anderson

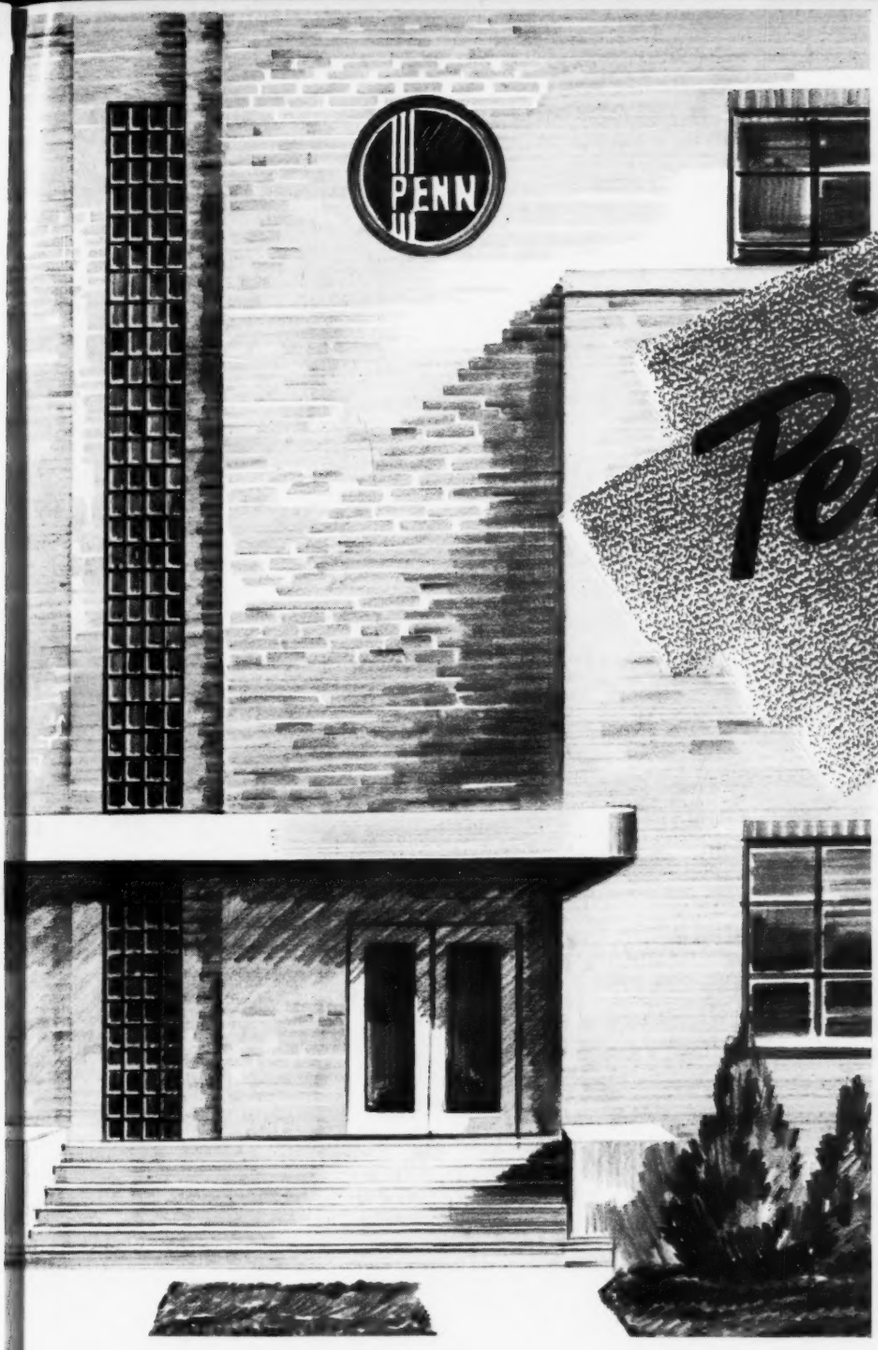
Approved Oct. 7 1939 Address

W. A. Swanson Telephone
Inspector.

D-59 1938

into the general fund of the city of Minneapolis. Each year the department budgets its expected expenses and requests this amount.

The first code in 1926 was passed by request of the heating trade. About 20 or 25 operators were behind the movement then and have been ever since. In all the years we have not had a really severe complaint from the contractors. Neither have



SPECIFY

Penn-Built Controls

FOR CUSTOMER SATISFACTION

On any heating, air conditioning, or refrigeration installation Penn-Built Controls give positive assurance of *accurate* performance, *dependable* operation. Equipment manufacturers choose controls by Penn because they meet the most exacting standards of their engineers, and the most gruelling tests of actual service. Dealers and service men, responsible to the final users, likewise favor Penn controls for trouble-free operation, and that most valued asset in business—*satisfied customers.*

AND DEALER PROFIT

Penn's outstanding engineering advances have been toward greater simplicity in structure and hence more dependability in service. Designed with the service man's problems in mind they save installation time... profitably cut installed costs.

Built to serve and not to service, Penn controls safeguard the dealer's profit through the period of service responsibility, and go on operating dependably through the years. Penn's thorough program of dealer training schools has shown the way to more profitable installations and better satisfied customers.

Specify Penn-Built Controls for automatic heating, air conditioning, refrigeration, pump and air compressor applications.

Every modern facility for engineering research and precision manufacture is afforded in Penn's new plant. Here Penn engineers develop new controls to meet the rapidly advancing needs of automatic equipment manufacturers... devise new tests to check the accuracy and dependability of Penn products. Penn workmen build with hair-line precision to meet the exacting requirements of Penn's rigid inspection service.

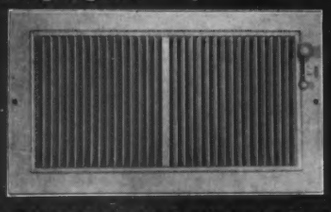
Penn Electric Switch Company, Goshen, Indiana. Branches in Principal Cities. Export: 100 Varick Street, New York City. In Canada: Powerlite Devices, Ltd., Penn Electric Switch Division, Toronto, Ontario.

PENN

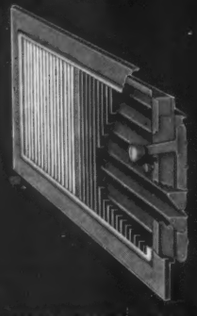
At the Sixth International Heating and Ventilating Exposition
Lakeside Hall, Cleveland. January 22-26. Booths—55 and 57

Beauty Steps in...

AIR CONTROL also offers a complete line of Sidewall Gravity Registers—Floor Registers and Faces—Damper Control Sets and the sensational AIR CONTROL Air Conditioning Register!



AIR CONTROL'S Air Conditioning Register —the solution to your air distribution problems — adjustable for BOTH vertical and horizontal air deflection.



Note how AIR CONTROL offers full adjustment from the face of the register for both vertical and horizontal air deflection.

No. 30 Sidewall Gravity Registers styled to harmonize with the attractive AIR CONTROL Baseboard Register—embodies all of the outstanding features of this sensational register.

AIR CONTROL steps out with a *beautiful new* Adjustable Gravity Baseboard Register that can also be used with *Forced Air!*

The AIR CONTROL Baseboard Register is a beautiful gravity type register—styled in the modern manner—a register designed to give you the maximum of efficiency and low resistance when used on gravity installations . . . and in addition . . . the fins may be easily adjusted to give you draftless air distribution for forced air installations.

Imagine what this means to you! When you use AIR CONTROL Gravity Registers, your new gravity installations can be converted into draftless forced air installations by simply adding a blower and adjusting the fins on the registers—you can also secure draftless air distribution on your converted gravity jobs by merely replacing the registers.

In addition AIR CONTROL Registers have many other superior features—SPONGE RUBBER GASKET, insures streakproof installations —IMPROVED VALVE MECHANISM, spring tension requires no adjustment—beautiful METALESCENT FINISH, a rich bronze finish at no extra cost — fin type construction, CONCEALS THE DUCT.

Even with all of its superior features and quality construction, this register costs no more than ordinary registers. Can you afford not to standardize on AIR CONTROL REGISTERS?

Bulletin 40 G contains full details and prices of AIR CONTROL'S new Gravity Baseboard Registers, Sidewall Gravity Registers, Floor Registers and Faces — Write today for your free copy, and name of the jobber in your territory who is handling AIR CONTROL products.

AIR CONTROL PRODUCTS, INCORPORATED
MUSKEGON MICHIGAN

★ Have you tried AIR CONTROL'S sensational Air Conditioning Registers adjustable BOTH vertically and horizontally? *Ask for Catalog 39-A.* ★

Air Control

AIR CONDITIONING REGISTERS AND GRILLES
GRAVITY REGISTERS AND DAMPER CONTROL SETS

we had too much objection from home owners, builders, architects. As a matter of interest, our code has year by year attracted local increased interest and we frequently have owners ask us—"which is the best plan," "which is the best furnace," "which is the best contractor." We feel that this is approval, well won.

If a permit is granted today for a job, inside of two days the builder will have plans submitted by six to a dozen other firms. All these will be for warm air systems. At the same time there may be one plan submitted for a radiator system. We believe the reason for this preponderancy of warm air is that the code has compelled the warm air

APPLICATION FOR GAS BURNER PERMIT

Permit No. M 6129

Location 4986 Duluth Ave

Minneapolis, Minn., Nov. 1 1939

John E. Nelson
~~LOUIS GLOOSING~~, Inspector of Buildings:

The undersigned hereby makes application for a permit for the work herein specified, agreeing to do all such work in strict accordance with the City ordinances and rulings of the Department of Buildings.

Owner James Carleton

Kind of Building Frame Used as Dwlg.

To be begun about Nov. 2 1939

To be completed about Nov. 15 1939

Estimated Cost, $ 225 00

Old-~~New~~ Building Application No.

Electrical Permit No.

DESCRIPTION OF WORK

Note: Insert before the word, "Burner," and before the words, "Gas supply piping," the word, install, alter or repair, according to which is to be done, and also indicate the number of burners affected thereby. Under "Remarks," specify any removal, or nature of any alterations.

Install 1 Burner..., conversion—unit; Trade name Gasco

..., Size No. 200G, Btu. Input 120M

...Gas supply piping 30 ft.

Type of Heating Plant; Steam—hot water—warm air: Connected load 60M

Btu., Proposed vent flue size (Diam. in inches) 5 Chimney flue dimensions 8"X12"

Remarks: 5" Liner

Signed Gas Appliance Co.

By John Doe

Inspected by M. LaDuke Date approved Nov. 16 1939

D-87 1938

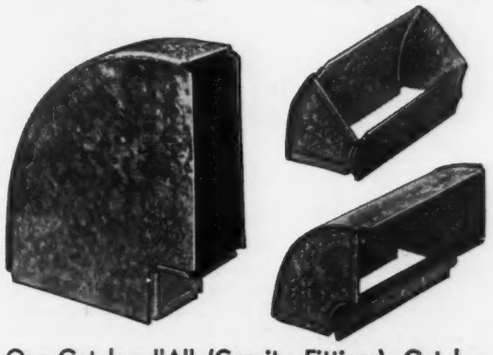
contractors to know exactly what they are doing and has given the warm air contractors confidence in their system. The radiator heating men, still depend upon the supply houses to draw their plans and do most of their designing.

The result is that in 1938, 60 warm air heating contractors completed 1,571 installations, (gravity or mechanical, new or replacement) in Minneapolis while 171 radiator contractors completed 606 installations of all types.

Our department has never conducted schools in warm air heating. But in the first years our inspectors were told to be patient and give as much time as possible to working with contractors in

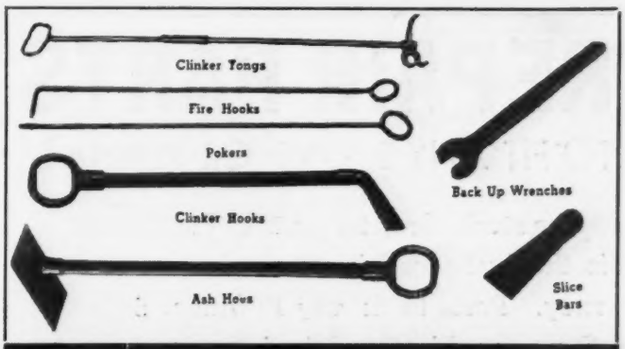
AJAX

A NEW LINE OF
PREFABRICATED DUCTS and FITTINGS
for Forced Air and Air Conditioning Installations



Our Catalog "A" (Gravity Fittings), Catalog "B" (Forced Air Fittings) are yours on request.

THE CINCINNATI
SHEET METAL & ROOFING CO.
Furnace Fitting Department
230 E. Front St. Cincinnati, Ohio

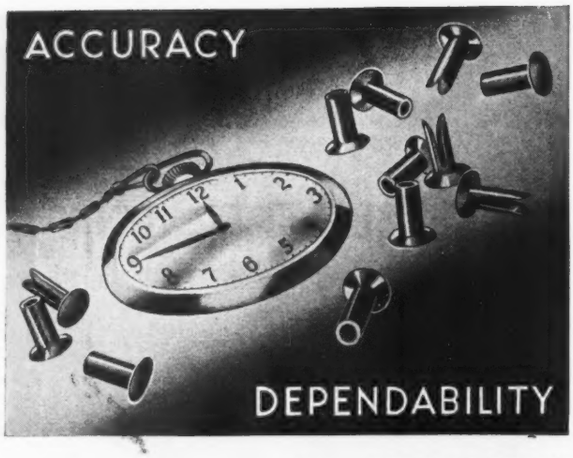


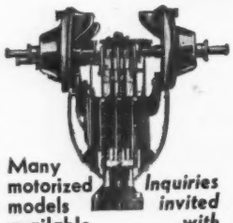
NOW IS THE TIME TO STOCK
- FARRELL-CHEEK -
QUALITY FURNACE TOOLS
A COMPLETE LINE FOR EVERY NEED

Sturdily constructed, Farrell-Cheek Tools are built to give years of severe usage, and designed to meet practical service requirements. They are efficient, easy to handle and very rigid to withstand abuse. All tools are constructed of durable cast steel with welded pipe couplings.

WRITE TODAY FOR CATALOG AND PRICES

FARRELL-CHEEK STEEL CO. SANDUSKY, OHIO





when PRECISION counts—

There is one item in your specifications you can decide upon without hesitation—T R & S Rivets. T R & S quality means every rivet, no matter how many thousands you need, is usable; rivets of uniform preciseness, accurately gauged to drive with smoothness, to clinch with non-brittle efficiency. We have solved the riveting problems of America's leading industrial concerns.

Many motorized models available in single stroke and multiple drive

Inquiries invited with samples of work you wish to do

TUBULAR RIVET & STUD CO.

World's Foremost Producers of Rivets

WOLLASTON MASSACHUSETTS

REPAIR PARTS

TO FIT ANY STOVE OR FURNACE

The stock of repair parts at Peninsular is the last word in quality and accuracy. Parts to fit any Furnace, Boiler, Stove or Air Conditioning equipment can be supplied at a moment's notice.

Why not order your next repair part from Peninsular? You'll be surprised at the speed and efficient service you receive.

Write us today for catalog.

PENINSULAR STOVE COMPANY
2699 Gratiot Ave. Detroit, Mich.

explaining "how" and "why." We conceive our position to be a requested cooperation with members of an industry wherein that industry, having set up practices of design and installation, asks us, as a disinterested judge, to see that these practices are lived up to. We exist because the industry wants our services and we will die whenever the industry wants us no longer. But we have never and do not intend to establish ourselves as a dictator. The Minneapolis ordinance is, we feel, a splendid example of an industry's willingness to give the owner a fair deal.

◆

Installation Codes

Allen W. Williams, Managing Director, National Warm Air Heating and Air Conditioning Association, 5 E. Long Street, Columbus, Ohio, says the demand for installation codes continues heavy. They are the accepted rules for city ordinances governing furnace installations.

The association has a limited supply of plain white cover codes, which are excellent to bind in with other literature of 8½x11 size. They are offered at a specially low price, as follows:

Standard Gravity Code..... .08c each
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To Determine Stoker Capacity

(*Continued from page* 119)

us, and see if it checks with the actual fuel consumption. In this case we shall have to assume an overall efficiency (E) for the hand-fired system as it has been operating during the time its fuel consumption averaged 100 tons a year. Here, again, much uncertainty exists and experience will play a vital part in the selection of the right value for (E). We shall assume an efficiency of 55% and a calorific value of 12,000 Btu per pound of the coal used in hand firing. With these data, equation (2) gives us:

F = 200,000 (in round figures) or 100 tons, which checks with the actual consumption.

The fact that it checks with actual consumption does not mean that the heat losses from the building as computed by us are bound to be absolutely correct, because our determination of the coal consumption depends on the value selected for the efficiency of the heating system under actual operating conditions, but we can feel reasonably sure that the actual heat losses will be correct within the limits of error which are unavoidable in this kind of work. If, on the other hand, we had found a great discrepancy between the computed and the actual coal consumption, then we should have reason to investigate and re-check both our heat loss calculations and the heating system, in order to discover whether we made mistakes in the former or whether we should have adopted a different efficiency for the heating system. In some instances this check is necessary in order to discover whether

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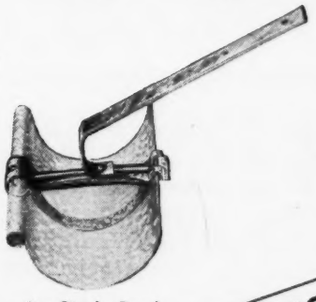

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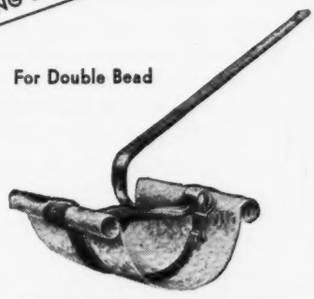

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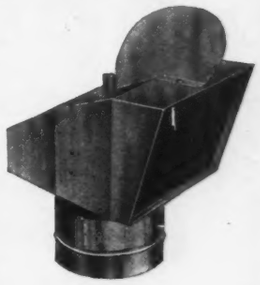

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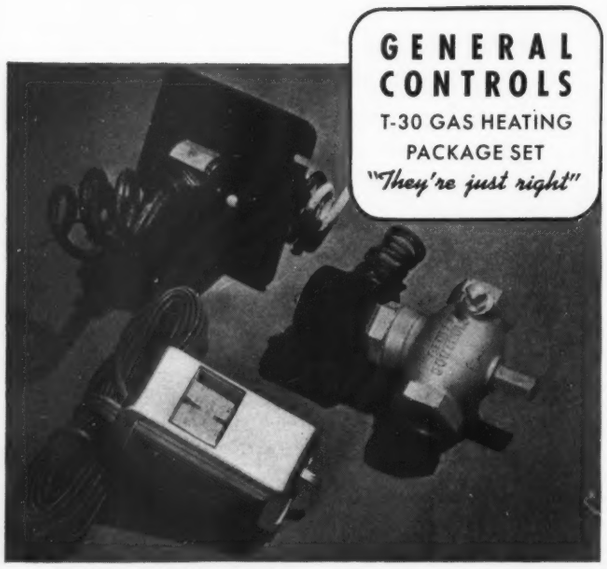

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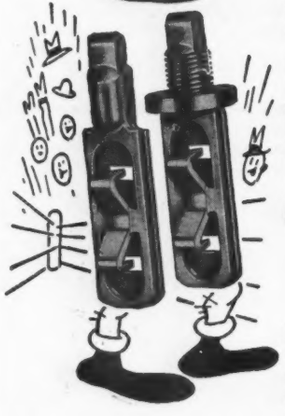

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we were told the truth about past coal consumption, or whether some unusual conditions exist either in the construction of the building or the performance of the heating system.

Size Must Be Chosen From Standard

Stokers are built in sizes which increase by finite steps, and it may be that we can supply either a 150- or a 200-pound stoker, but none between these two capacities. Before deciding upon either one, we shall have to consider all the factors affecting the size of the stoker. We have already mentioned that if the building were heated by a hot water system we could allow 10 instead of 8 hours' total working time. In this case, then, a 150-pound stoker would be satisfactory. With a steam heating system a 200-pound stoker would, in general, be the better choice, but if upon more close investigation of the system we find that we could allow a greater efficiency than the 65% chosen in our preliminary estimate, or that we could suggest to the owner some ways to reduce the heat losses from the building which he would be willing to carry out, then we could still install a 150-pound stoker.

Much will also depend on the heating schedule followed in the building. If the building is an apartment house in which the temperature is only slightly lowered at night, a 150-pound stoker may be sufficient, whereas it might not be large enough in a commercial building in which the heat is turned off at night entirely and yet in the morning the temperature must be brought up to standard in a short time. In the last case, and still more particularly in schools, theaters, churches, and like buildings, which are left without heat for long periods, a safe procedure is to install a stoker capable of developing the full capacity of the boiler as rated by its manufacturer.

We should guard, however, from following this same procedure in ordinary buildings in which occasionally we may find a boiler that is undersize even for maintaining a steady temperature in very cold weather. In this case we should be guided by the heat losses from the building and not by the size of the boiler. This point will be made more clear when we deal with the question of stoker-boiler efficiency later.

Size From Standing Radiation

Another method of figuring the size of the stoker is as follows: Count the number of square feet of installed radiation, add ⅓ of this amount for pipe radiation and for pick-up, and finally add ½ square foot for each gallon capacity of the domestic hot water storage tank if the water is heated by an indirect heater. Multiply this number by 4 and divide it by 100. The results will be the maximum stoker capacity in pounds per hour required in a steam heating system.

If the heating system is hot water, reduce the number of square feet of installed radiation to the amount of equivalent steam radiation by dividing it by 1.6 for gravity, and by 1.2 for forced hot

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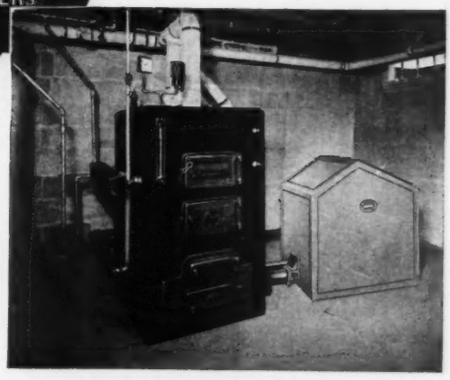

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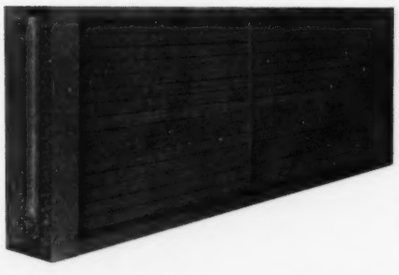

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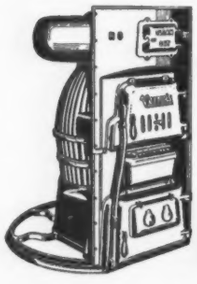

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water. In a gravity hot water system there will be no indirect domestic hot water heater, while in the case of a forced hot water system provided with an indirect heater we shall have to add ½ square foot for each gallon capacity of the storage tank to the equivalent steam radiation.

We do not recommend this method of figuring the maximum capacity of a stoker because it depends entirely on the correctness of the amount of radiation installed. It can, however, be used to advantage as a check. Any one method of figuring can give only an approximate determination of the stoker capacity required, and for this reason it is preferable to count on the average of many measurements rather than only on the one we deem most nearly accurate.

If a hot water system is, or has been, converted from gravity to forced water circulation, the amount of installed radiation should be counted as gravity and therefore divided by 1.6 in order to reduce it to the equivalent steam radiation.

Smaller Sizes in Furnaces

When a stoker is to fire a furnace we recommend a smaller size than in the case of a boiler for the same heat loss from the building. We have already given the reason for this suggestion, but we can add another, namely: that it is neither comfortable for the occupants, nor safe, to raise the temperature of the air in the bonnet and therefore at the registers much beyond the standard chosen in designing the system on the basis of continuous firing. If our stoker maintains a 70 degree inside temperature during the average heating period of 16 hours, when the outside temperature is the lowest assumed for design purposes in ten hours' operating time, it means that during that time it would have to supply 1.6 times as much heat as during an equal period of constant operation. In a gravity system the circulation would somewhat increase because of a higher differential between the temperature of the warm air and the temperature of the return air, but by no stretch of the imagination would this increase amount to 1.6 times, therefore, the extra heat has to come mostly from a rise in temperature of the circulated air.

Size For Forced Air Furnace

With a winter air conditioning unit the circulation is fixed by the capacity of the blower and the extra heat has to come exclusively from a higher air temperature. In order to keep this rise at a minimum it will be necessary to have the stoker operate almost continuously. On account of the foregoing considerations and because of other reasons already mentioned we suggest that the total operating time be extended; in other words, that the size of the stoker measured by the pounds of coal it can burn per hour be selected on the basis of a coefficient of safety rather than on the basis of a 6 to 10 hours total operation.

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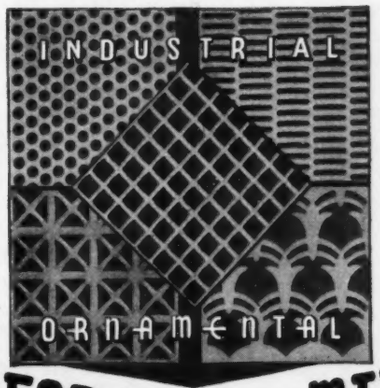

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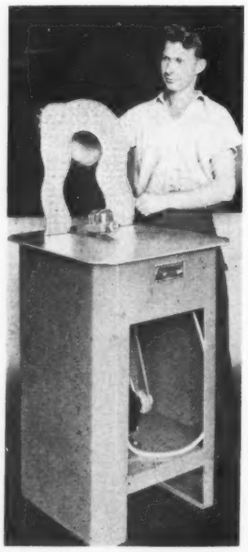

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termittent operation. If we apply this suggestion to our first example, the capacity of the stoker for a warm air heating system should be only 7.7 × 1.5 or 11.5 pounds per hour. If the stoker is run at a higher rate, the stoker "on" periods will be very short because the high limit airstat will stop the stoker long before the thermostat is satisfied. Such an operation is wasteful in coal and objectionable to the occupants because of the extra noise made by the blower and the motor when starting.

Summer and Winter Domestic Hot Water Hook-up

When a stoker is installed in either a steam or hot water heating system, the domestic water is usually heated by an indirect heater using the boiler-stoker combination for that purpose. In a hot water system it will be necessary first of all to convert the system from gravity to forced circulation by installing a circulating pump and a flow control valve, in order to control the circulation of the water in accordance with the heat requirements of the building, while the water in the boiler is kept by one or two aquastats at a temperature that will assure ample supply of hot water for domestic uses. With this arrangement the thermostat controls the operation of the pump alone or of the pump and stoker together, depending on whether we use one or two aquastats. When the thermostat does not call for heat, the stoker (but not the pump) can be operated independently by the aquastats in order to maintain the temperature of the water in the boiler within two set limits. Without this arrangement domestic water would be heated only when the thermostat calls for heat, whereas after these changes have been made the system can be used summer and winter to provide domestic hot water. The water in the boiler is circulated around a coil or a set of straight tubes inside of which runs the fresh water to be heated.

In order to prevent the possibility of raising the pressure in the boiler above that due to the height of the column of water, it is necessary to install a reverse-action aquastat that will operate the pump if the temperature of the water overshoots a set level. By this action the water in the boiler is cooled as it mixes with the water in the system. When its temperature drops to the lower limit of the reverse-action aquastat the pump is stopped.

Indirect Heater on Steam Boiler

In a steam system the indirect heater is either immersed in the boiler water or the water is circulated through an outside heater. The two aquastats will keep the water between two set limits, the high one being well below the boiling point, usually around 160 degrees. These aquastats are in parallel with the thermostat and therefore they operate the stoker independently of the thermostat so that the water in the boiler is kept by them between the two set temperatures when the thermostat does not call for heat. Of course, when the latter calls for heat the stoker is under its control and will raise

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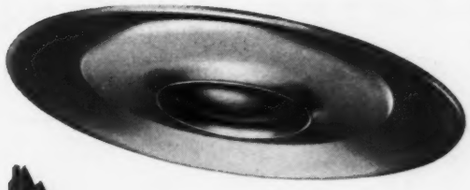

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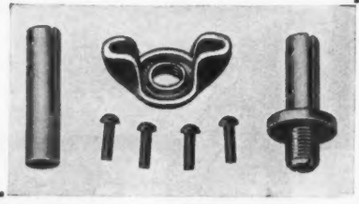
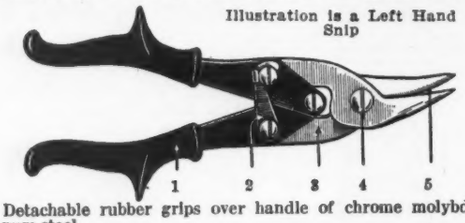


KLENK'S Double Action Aviation Snips

Illustration is a Left Hand Snip



1. Detachable rubber grips over handle of chrome molybdenum steel
2. Adjustable lock
3. Special hardened alloy steel. Tensile strength 3500 lb.
4. A. & H. Standard bolts
5. Curved jaws for cutting ends of tubing to .065 in. wall

BIG VALUE—LOW COST—A trial will convince you. Made for both right and left hand—straight or curves—Easy to work—Order today.

KARL KLENK'S AVIATION SNIPS

107 E. FIFTH ST. WILMINGTON, DELAWARE

steam up to the pressure limit set by the pressuretrol.

It is necessary to explain this arrangement in detail because its operation is related to the trouble sometimes experienced in connection with stoker firing. The trouble arises from the fact that when the stoker is stopped by either the thermostat or the aquastat, the flow of heat to the boiler is not stopped at the same time, as occurs with oil firing. Some coal is left over from the previous operation and this coal continues to burn, although more slowly. If a thick bed was allowed to form during the running period, heat may be generated at such a rate that steam will be raised in a steam boiler and the temperature of the water raised to the limit set on the reverse-action aquastat in a hot water system. In the first case steam may reach the radiators, and in the second very hot water will be circulated through them. In winter time this will result in a slightly higher room temperature than that set on the thermostat but usually will not cause discomfort. In summer time, however, and especially on a very hot day when this trouble is most likely to occur, it will cause great discomfort to the occupants of the building.

In order to prevent its occurrence it is necessary either to reduce the rate at which coal is being fed to the boiler, using one of the lower speeds provided in the stoker, or to increase the rate at which the coal that is being fed is burned; in other words, to increase the air supply above what would be considered best for good efficiency.

Reducing the coal feed alone may not accomplish our purpose, which is to avoid the accumulation of unburned coal in the fire box. During winter operation the coal bed should be allowed to build up several inches over the top of the retort no matter what the speed at which the coal is being fed, but during the summer we should prevent this by burning all the coal as it is being fed. This is, from the point of view of efficiency, a poor practice and should therefore be adopted only to the extent that is necessary in order to prevent heating the premises when no heat is desired.

A similar condition arises during the mild weather in a warm air system. Here it is not a question of supplying the domestic hot water, as with a furnace this is only incidental and contingent to the heat requirements of the building. We mention it at this point because the trouble is of the same nature, namely: that if too much coal accumulates in the fire box during a firing period, heat will continue to be supplied to the furnace even after the stoker has stopped, and this heat will for the most part be delivered to the rooms. If the weather is mild, the heat supplied after the stoker has stopped may be enough to raise the room temperature several degrees and make conditions uncomfortable for the occupants. It will therefore be necessary to see that the coal is burned as it is fed without going to such extremes that the fire will go out between operating cycles caused by the hold-fire control for lack of enough coal to maintain the fire.

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My . . . you're a smart man! This won't be a "Cold Room" anymore!

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Contractor's Cost Only $6.00

In just 3 minutes you can cure a "cold room" forever. A powerful Victor Heat Booster pulls out the cold air "cork" and brings the heat up fast. Installed at the register and connected to nearest electric outlet it is the easiest, quickest and most satisfying way to meet "cold room" complaints. Ask your Jobber or write for attractive dealer discounts and special profit boosting sales plan. Write today!

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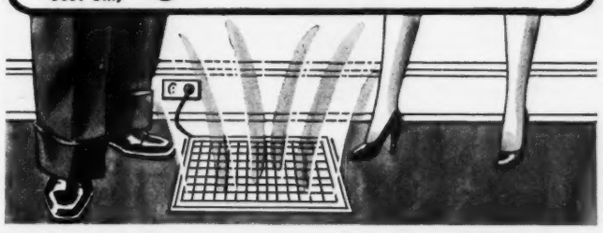
WALL MODEL
Contractor's Cost Only $8.65

VICTOR
HEAT BOOSTERS



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TURBINE VENTILATORS

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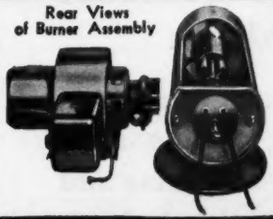
MODEL "O"

Rear Views of Burner Assembly



Air passes across the end of the tube (not through it) with adequate rotation causing the air to spread out fan-shape in exactly the same manner and shape as the conical oil spray leaving the jet. The result is a perfect, sunflower-shaped fire.

Dealers investigate!

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No Blower Needed

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Baffle Plate and Work-Rest Block Included

This No. 101 Johnson Bench Furnace will do a more powerful, efficient and economical job every time. Designed for soldering coppers up to 12 lbs. per pair. It's the right furnace for heat-treating, annealing or case-hardening carbon steel tools. NO BLOWER REQUIRED. The Johnson Patented Curved Hood forces a return blast over parts being treated. Base and hood heavily lined with refractory.

Firebox forms rest and protects points of coppers. Equipped with two Johnson Burners, shut-off valve and pilot light. Heavily constructed to give maximum performance at low cost.

WRITE TODAY FOR NEW JOHNSON CATALOG

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA
519 E. Ave. N. W.
ESTABLISHED 1901

1939—Climax To A Hectic Decade

(*Continued from page 79*)

ously consider the feasibility of manufacture in some small sheet metal shop. Where the unit to be fabricated does not run into tens of thousands of items, hundreds of power-equipped shops can and are bidding successfully.

And, lastly, as to the future—1940 will be a "political year." As such there may be some lessening of the political pressure of the last five years. More taxes, new taxes, are coming. National defense is expected to take the place of "pump priming" with numerous and novel schemes to raise money for defense. Most of us will probably pay more taxes in 1940.

Of interest to this industry is the probe into construction industry restrictions. The program has already been launched in several large cities and will be widened. Price fixing, restraint of trade, boycotting of materials, patent pooling, collusion between employer groups and organized labor, are and will be under fire in 1940.

There will be a national deficit in 1940; probably state and county deficits; there seems to be no more than minor revisions in spending requirements—all of which indicates that as individuals or as firms this industry will pay as much in taxes in 1940 as in 1939.

A Heat Hustler Fan Forces Air Through a Single Warm Air Pipe

Heat garages, sun porches and other rooms that will not heat by gravity. Mounts directly in the warm air pipe. Draws heat from the furnace and forces it into the hard-to-heat room. Quick heat for a bathroom.

Four reasons why you should use the American Heat Hustler:

1. It uses a positive pressure, rotary type fan.
2. Motor is outside the warm air flow, adding greatly to life of motor and leaving as much space for gravity air flow as before the Heat Hustler was installed.
3. It is quiet.
4. Furnished for either automatic or manual control.

Price list, with descriptive literature showing different models, sizes, etc., will be sent you by return mail upon receipt of your request. CLIP AND SEND THIS AD IN NOW!

Patented

AMERICAN FOUNDRY & FURNACE COMPANY
Bloomington, *World's largest manufacturers of blower furnace systems* **Illinois**

PORTABLE SHEARS
ALL-ALLOY

ALL-ALLOY No. 2 cuts up to ¼" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

FULLY GUARANTEED

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ALMAR EASY SLITTER

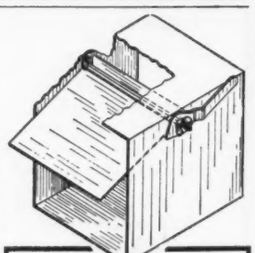
Speed up your work without an 8' or 10' foot or power squaring shear.

* * *

So easy a girl can operate it. Write for details.

WARD MACHINERY COMPANY
564 W. Washington Blvd. Chicago, Illinois

O. K. **on All Points!**



Save time and do a better job with the patented new MINUTE Damper Regulator! Its simplified design gives you many advantages. Absolutely chatter-proof . . . no buckling . . . air-tight . . . rigid . . . easy to install . . . no tiny nuts, bolts, rivets, sheet metal screws. Fully guaranteed for wide range of damper shapes and sizes. Joal Manufacturing Corporation, 2058 Canton St., Toledo, O.

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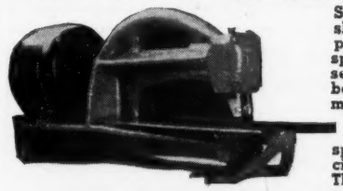
MINUTE DAMPER CONTROL

Furnace Manufacturers and Jobbers:

Armstrong Furnace Company, Columbus, Ohio, builds steel furnaces under your name and trade mark for every fuel.

FASTER METAL CUTTING
WITH THE S-L JIG SHEAR



Streamline speed for cutting sheet metal of all kinds is possible with S-L high speed jig shear. A sturdy semi-steel frame and rubber mounted G-E ¼ h.p. motor driving a dural cutter head and hardened tool steel knives at high speed mean lifetime precision and service.
The S-L cuts intricate compound curves and shapes in 18 gauge (.050″) mild steel or equivalent in softer materials. Leaves a clean smooth edge which requires no filing. 10″, 18″ or 24″ throat. Inside cuts without starting hole.

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Apex C-41 Set Illustrated.

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CUSTOMER SATISFACTION
By Selling
"STEEL MIXTURE"
Refractory
BAFFLE PLATES
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DOMESTIC STOKERS

These baffles insure higher CO_2, lower stack temperatures, lower fuel bills, cleaner flues and more heat per lb. of coal.
Write for Bulletin 400 and price list.

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"ALNOR" VELOMETER

Use an "ALNOR" Velometer on all your air conditioning or warm air installations. It will save you countless minutes in determining air velocities instantly and accurately without timing or mathematical calculations. Standard range 0—300, 0—3000 f.p.m. Other ranges available up to 18,000 f.p.m.

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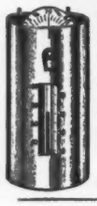

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A-C THERMOSTATICALLY CONTROLLED AUTOMATIC HEAT BOOSTER

Everything the Home Owner wants in a Furnace Fan—At a price Every Furnace Owner Can Afford to Pay.
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Now, men, you can have a Practical Crimper!
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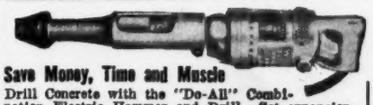
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REGULAR RETAIL PRICE $2.50
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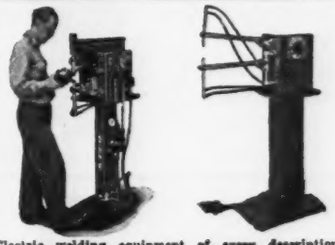
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Describes OVER 2,000 TOOLS in stock for immediate shipment. Completely indexed. Full specifications. Over 250 illustrations, 52 pages. Durably bound for permanent reference.
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Classified

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SITUATIONS OPEN

SALESMEN: Open territory in Wisconsin and Ohio after Jan. 1, 1940. Complete line Gas, Coal and Oil Furnaces and Air Conditioners. Steam and Hot Water Boilers, Radiation and Water Heating Equipment. Experience war air work necessary. Some established business. Commission basis only. Address Key No. 479, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

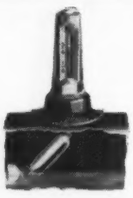
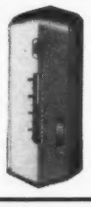
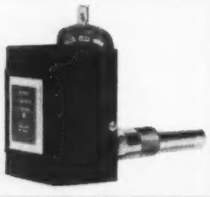
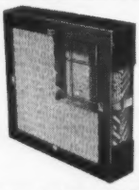
MISCELLANEOUS

Sheet metal worker, 25, shop man, lay out, read blue-prints, estimate heating, size ducts, typist, bookkeeper, Gentile, desires to invest $500 in going, reputable business in vicinity Philadelphia, Penna. Address Key No. 482, American Artisan, 6 N. Michigan Ave., Chicago, Ill.

Use AMERICAN ARTISAN Classified Advertising for quick results. It puts you in direct touch with the buyers and sellers in the warm air heating, sheet metal contracting and air conditioning industry.

SERVICE SECTION: Rates for display space similar to above in Service Section are $5.00 per inch per insertion. One-inch minimum space accepted. **Classified Section:** Rates for classified advertising are 5 cents for each word including heading and address. Count seven words for keyed address. Minimum $1.00 for each insertion. Cash must accompany order.

"Genuine Detroit" CONTROLS

WHAT IT IS	WHERE IT IS USED	WHAT IT DOES
CRC-100 Anti-Syphon Valve	Used on all pressure type oil burner installations.	It prevents oil siphoning out of the storage tank in case a leak develops in the fuel delivery line, and also serves as a ball check and back pressure relief valve.
CRC-425 Fuel Storage Gage 	Applicable to any inside domestic fuel oil storage tank.	Shows the amount of fuel in the tank. Other models are available for both inside and buried tanks.
CRC-236 Safety Float Valve (Manual Type)	Applicable to any gravity type oil burner.	Meters fuel to the burner under single or dual manual control —includes constant level valve, safety trip mechanism and strainer.
CRC-236 Safety Float Valve (Automatic Type)	For all automatically controlled gravity type oil burners.	Controls fuel flow automatically in accordance with changes in temperature or pressure.
Two-Eleven Thermostat 	Used in control circuit for heating and air conditioning installations.	Controls the operation of burner motor, solenoid valve, damper motor or Thermotor gas valve in accordance with changes in room temperature—available with or without preheater.
No. 653 Immersion Control* 	Thermal element is inserted below the water line on automatically fired low pressure steam boilers.	Operates the automatic burner to maintain a minimum boiler water temperature, to assure adequate supply of domestic hot water summer and winter. *Licensed under Taco-Abbott System patents.
Detroit Air Filter 	Applicable to both summer and winter air conditioning systems.	Removes dust and pollen from intake air—retains its efficiency longer and has a very low air resistance with no spot clogging.

DETROIT LUBRICATOR COMPANY General Offices: DETROIT, MICHIGAN
Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED

Section of

JANUARY, 1940

AMERICAN ARTISAN

1940 DIRECTORY

OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

Section 1.—Products Classified

Section 2.—Trade Names

Section 3.—Manufacturers' Addresses

HOW TO USE THIS DIRECTORY

If you want to know the names of one or more manufacturers making a certain product, look in Section 1, where that product will appear in its proper place in the listing. If you have the trade name of a product and want to know who manufactures it, look in Section 2, where trade names are alphabetically listed. For the complete name and address of any manufacturer, look in Section 3.

● The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 206, for the page on which you will find the advertising of any of these manufacturers.

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Section of

American Artisan

1940 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

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● The manufacturers whose names are dotted throughout the listings advertise their products in this issue. Turn to Index to Advertisers, page 206, for the page on which you will find the advertising of any of these manufacturers.

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Connor Engineering Corp., W. B., Dorex Air Conditioning Div., New York City.

AIR CONDITIONING UNITS, CENTRAL PLANT, SUMMER

(Self-contained fan, filter and cooling coil unit for connection to refrigerating compressor or cold water supply with duct distribution of air)

●Airtemp Division, Chrysler Corp., Dayton, O.
Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Ballantyne Company, Omaha, Nebr.
Betz Air Conditioning Corp., Kansas City, Mo.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Corozone Air Conditioning Corp., Cleveland.
Curtis Refrigerating Machine Co., St. Louis.
Dail Steel Products Co., Lansing, Mich.
Electrol Incorporated, Clifton, N. J.
Fairbanks, Morse & Co., Chicago.
Fedders Mfg. Co., Inc., Buffalo, N. Y.
●Fitzgibbons Boiler Co., Inc., New York City.
Frigidaire Commercial & Air Conditioning Division, Gentral Motors Sales Corporation, Dayton, O.
●General Electric Co., Bloomfield, N. J.
General Refrigeration Corp., Beloit, Wis.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Company, Inc., Hastings, Nebr.
Hoffman Specialty Co., Inc., Waterbury, Conn.
Howe Ice Machine Co., Chicago.
Ilg Electric Ventilating Co., Chicago.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
Kauffman Air Conditioning Corp., St. Louis.
Kelvinator Div., Nash-Kelvinator Corp., Detroit.
Kramer Trenton Co., Trenton, N. J.
McCord Radiator & Mfg. Co., Detroit.
McQuay, Inc., Minneapolis, Minn.
Marlo Coil Co., St. Louis.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York City.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Pernot & Rich, Inc., Los Angeles.
●Premier Furnace Company, Dowagiac, Mich.
Red Jacket Mfg. Co., Davenport, Ia.
Refrigeration Economics Co., Inc., Canton, O.
Sturtevant Co., B. F., Boston.
●Surface Combustion Corp., Toledo, O.
Timken Silent Automatic Div., The Timken-Detroit Axle Co., Detroit.
Trane Co., LaCrosse, Wis.
●U. S. Air Conditioning Corp., Minneapolis.
United States Radiator Corp., Detroit.
●Waterman-Waterbury Co., Minneapolis.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, CENTRAL PLANT, WINTER, SPLIT SYSTEM TYPE

(Self-contained fan, filter, humidifier and heating coil unit for connection to steam or hot water boiler with duct distribution of air)

●Airtemp Division, Chrysler Corp., Dayton, Ohio.
Alladdin Heating Corp., Oakland, Cal.
Allis-Chalmers Manufacturing Company, Milwaukee.
American Blower Corp., Detroit.
Betz Air Conditioning Corp., Kansas City, Mo.
Brundage Co., Kalamazoo, Mich.
Carrier Corp., Syracuse, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Co., St. Louis.
Easternoil, Inc., Portland, Maine.
Electrol Incorporated, Clifton, N. J.
Fairbanks, Morse & Co., Chicago.
Fedders Mfg. Co., Buffalo.
●Fitzgibbons Boiler Co., Inc., New York City.
●General Electric Co., Bloomfield, N. J.
Handelan Washed Air Company, Minneapolis.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
●Johnson Co., S. T., Oakland, Cal., and Philadelphia
Kauffman Air Conditioning Corp., St. Louis.
May Oil Burner Corp., Baltimore.
Mayflower Air-Conditioners, Inc., St. Paul.
Modine Mfg. Co., Racine, Wis.
●Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Pocahontas Fuel Corp., Stoker Div., Cleveland.
Refrigeration Economics Co., Inc., Canton, O.
●Surface Combustion Corp., Toledo, O.
Trane Co., LaCrosse, Wis.
●U. S. Air Conditioning Corp., Minneapolis.
United States Radiator Corp., Detroit.
Utica Radiator Corp., Utica, N. Y.
●Waterman-Waterbury Co., Minneapolis.
Western Blower Company, Seattle, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Wood Industries, Inc., Gar, Detroit.

AIR CONDITIONING UNITS, EVAPORATIVE TYPE, SUMMER

(For cooling with sprays, no dehumidification)

Air-O-Line Co., The, Dallas, Tex.
American Blower Corporation, Detroit.
Ames Co., W. R., San Francisco.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Ballantyne Company, Omaha, Nebr.
Brundage Co., Kalamazoo, Mich.
Campbell Heating Co., E. K., Kansas City, Mo.
Coolmaster Corp., Chicago.
Economy Electric Manufacturing Co., Cicero, Ill.
Fairbanks, Morse & Co., Chicago.
Hall Mfg. Co., Cedar Rapids, Ia.
Montag Stove & Furnace Works, Portland, Ore.
Mountain States Equipment Co., Denver, Colo.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Palmer's Manufacturing Corp., Phoenix, Ariz.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Pernot & Rich, Inc., Los Angeles.
Royal Air Conditioning Equipment, Compton, Cal .
Shreveport Eng. Co., Inc., Shreveport, La.
Star Radiator Company, Los Angeles, Cal.
Todd Air Conditioning Co., Inc., Bonner Springs, Kansas.

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●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utility Fan Corporation, Los Angeles, Cal.
Western Blower Company, Seattle, Wash.
X L Refrigerating Co., Inc., Chicago.

AIR CONDITIONING UNITS, ROOM TYPE, SUMMER, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

(Self-contained blower, coil, filter unit for connection to remote compressor or cold water supply)

Airgard Manufacturing Co., Chicago.
●Airtemp Division, Chrysler Corp., Dayton, Ohio.
Ballantyne Co., Omaha, Nebr.
Carrier Corp., Syracuse, N. Y.
Crystal Refrigerator Co., Fremont, Nebr.
Curtis Refrigerating Machine Co., St. Louis.
Dunham Co., C. A., Chicago.
Fairbanks, Morse & Co., Chicago.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
●General Electric Co., Bloomfield, N. J.
Giant Mfg. Co., Council Bluffs, Iowa.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Ilg Electric Ventilating Co., Chicago.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Johnson Fan & Blower Corp., Chicago.
Kauffman Air Conditioning Corp., St. Louis.
Kelvinator Div., Nash Kelvinator Corp., Detroit.
Kennard, Inc., Sam, St. Louis.
King Ventilating Co., Owatonna, Minn.
McQuay, Inc., Minneapolis.
Modine Mfg. Co., Racine, Wis.
Nelson Corp., Herman, Moline, Ill.
Nesbitt, Inc., John J., Philadelphia.
●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
Norwin Co., Freeport, Ill.
Perham Products, Inc., Chicago.
●Premier Furnace Company, Dowagiac, Mich.
Refrigeration Economics Co., Inc., Canton, O.
Standard Air Conditioning, Inc., New York City.
Trane Company, LaCrosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
●U. S. Air Conditioning Corp., Minneapolis.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
York Ice Machinery Corp., York, Pa.
X L Refrigerating Company, Inc., Chicago.

AIR CONDITIONING UNITS, ROOM TYPE, SUMMER, FLOOR CABINET, SELF-CONTAINED COMPRESSOR, UNDER 3 H. P.

(Self-contained blower, coils, compressor and filter unit)

●Airtemp Div., Chrysler Corp., Dayton, O.
Apex Rotarex Corp., Cleveland.
Burrowes Corp., Portland, Maine.
Carrier Corp., Syracuse, N. Y.
Corozone Air Conditioning Corp., Cleveland.
Curtis Refrigerating Machine Co., St. Louis.
Electrol Incorporated, Clifton, N. J.
Fairbanks, Morse & Co., Chicago.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
Gale Products, Galesburg, Ill.
●General Electric Co., Bloomfield, N. J.
General Refrigeration Corp., Beloit, Wis.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Governair Corp., Oklahoma City, Okla.
Harvey-Whipple, Inc., Springfield, Mass.
Ice Cooling Appliance Corp., Morrison, Ill. (Ice)
Ilg Electric Ventilating Co., Chicago.
Indian Trailer Corporation, Koolroom Div., Chicago.
Kauffman Air Conditioning Corp., St. Louis.
Kelvinator Division, Nash-Kelvinator Corp., Detroit.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
National Standard Air Products Co., Chicago.
●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
Philco Radio & Television Corp., Philadelphia.
Pleasantaire Corp., Washington, D. C.
●Premier Furnace Company, Dowagiac, Mich.
Standard Air Conditioning, Inc., New York City.
Standard Stoker Corporation, New Albany, Ind.
Timken Silent Automatic Div., The Timken-Detroit Axle Co., Detroit.
Trane Co., LaCrosse, Wis.
Westinghouse Electric & Manufacturing Co., East Springfield, Mass.
York Ice Machinery Corp., York, Pa.

AIR CONDITIONING UNITS, ROOM TYPE, WINTER, FLOOR CABINET

(Self-contained blower, filter, heating coil, humidifier unit

●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
●Airtemp Division, Chrysler Corp., Dayton, Ohio.
Apex Rotarex Corp., Cleveland.
Burnham Boiler Corp., Irvington, N. Y.
Burrowes Corp., Portland, Maine.
Campbell Heating Company, Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Drayer & Hanson, Inc., Los Angeles.
Dunham Co., C. A., Chicago, Ill.
Easternoil, Inc., Portland, Me.
Electrol Incorporated, Clifton, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
●General Electric Co., Bloomfield, N. J.
Grinnell Co., Inc., Providence, R. I.
●Henry Furnace & Foundry Co., Cleveland.
Ilg Electric Ventilating Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard, Inc., Sam, St. Louis.
Mayflower Air-Conditioners, Inc., St. Paul.
McQuay, Inc., Minneapolis, Minn.
Nelson Corp., Herman, Moline, Ill. (Floor)
Nesbitt, Inc., John J., Philadelphia.
●Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
●Pacific Gas Radiator Company, Huntington Park, Cal.
Perham Products, Inc., Chicago.
●Premier Furnace Company, Dowagiac, Mich.
Royal Air Conditioning Equipment, Compton, Cal.
Refrigeration Economics Co., Inc., Canton, Ohio.
Reznor Mfg. Co., Mercer, Pa.
Somers, Inc., H. J., Detroit, Mich.
Standard Air Conditioning, Inc., New York City.
●Surface Combustion Corp., Toledo, O.
Trane Co., LaCrosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
●U. S. Air Conditioning Corp., Minneapolis.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

AIR CONDITIONING UNITS, ROOM TYPE, YEAR AROUND, FLOOR CABINET

(Self-Contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply and steam or hot water)

●Airtemp Division, Chrysler Corp., Dayton, Ohio.
Apex Rotarex Corp., Cleveland, O.
●Baker Ice Machine Co., Inc., Omaha, Nebr.
Betz Air Conditioning Corp., Kansas City, Mo.
Carrier Corp., Syracuse, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Corozone Air Conditioning Corp., Cleveland, O.
Curtis Refrigerating Machine Co., St. Louis.
Dail Steel Products Co., Lansing, Mich.
Dunham Co., C. A., Chicago.
Fairbanks, Morse & Co., Chicago, Ill.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
●General Electric Co., Bloomfield, N. J.
General Refrigeration Corp., Beloit, Wis.
Grinnell Co., Inc., Providence, R. I.
Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit.
Kennard, Inc., Sam, St. Louis.
Mayflower Air-Conditioners, Inc., St. Paul.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Nelson Corp, Herman, Moline, Ill.
Nesbitt, Inc., John J., Philadelphia.
●Norge Heating & Conditioning Div. of Borg-Warner Corp., Detroit, Mich.
Perham Products, Inc., Chicago.
●Premier Furnace Company, Dowagiac, Mich.
Refrigeration Economics Co., Inc., Canton, Ohio.
Standard Air Conditioning, Inc., New York City.
Trane Co., La Crosse, Wis.
Unified Air Conditioner Co., Duluth, Minn.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

● Advertisement in this issue. See Index to Advertisers, page 206

AIR CONDITIONING UNITS, STORE TYPE, SUMMER, FLOOR CABINET, SELF-CONTAINED COMPRESSOR, 3 H. P. AND OVER

(Self-contained blower, coil, compressor, filter unit, with air discharge approximately 6 ft. above floor)

- ●Airtemp Division, Chrysler Corp., Dayton, O.
- Baker Ice Machine Co., Inc., Omaha, Neb.
- Buffalo Forge Co., Buffalo, N. Y.
- Carrier Corp., Syracuse, N. Y.
- ●Clarage Fan Co., Kalamazoo, Mich.
- Curtis Refrigerating Machine Co., St. Louis.
- Fairbanks, Morse & Co., Chicago.
- Frick Co., Waynesboro, Pa.
- Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
- ●General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
- General Refrigeration Corp., Beloit, Wis.
- Kauffman Air Conditioning Corp., St. Louis.
- Kelvinator Div., Nash-Kelvinator Corp., Detroit.
- McQuay, Inc., Minneapolis.
- ●Meyer Furnace Co., Peoria, Ill.
- Niagara Blower Co., New York City.
- ●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
- ●Premier Furnace Company, Dowagiac, Mich.
- Refrigeration Economics Co., Inc., Canton, O.
- Standard Air Conditioning, Inc., New York City.
- Trane Co., LaCrosse, Wis.
- Vilter Mfg. Company, Milwaukee.
- Westinghouse Electric & Mfg. Co., East Springfield, Mass.
- Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
- York Ice Machinery Corp., York, Pa.

AIR DIFFUSERS

See Diffusers, Air

AIR FILTERS

See Filters, Air

AIR METERS

See Meters, Air Velocity, Direct Reading

AIR WASHERS

See Washers, Air

ANALYZERS, CO_2, PORTABLE

- Bacharach Industrial Instrument Co., Pittsburgh, Pa.
- Barclay, Inc., Robert, Chicago.
- Defender Automatic Regulator Co., St. Louis.
- Dwyer Mfg. Co., F. W., Chicago.
- Ellison Draft Gage Co., Chicago, Ill.
- Engelhard, Inc., Chas., Newark, N. J.
- Friez & Sons, Julien P., Baltimore.
- Hays Corp., Michigan City, Ind.
- Hotstream Heater Co., Cleveland.
- Huyette Co., Inc., Paul B., Philadelphia.
- Preferred Utilities Corp., New York City.

ANEMOMETERS

- American Instrument Co., Silver Spring, Md.
- Bristol Co., Waterbury, Conn.
- Friez & Sons, Julien P., Baltimore, Md.
- H-B Instrument Co., Inc., Philadelphia.
- Hill Co., E. Vernon, Chicago Ill.
- ●Illinois Testing Laboratories, Inc., Chicago, Ill.
- Precision Thermometer & Instrument Co., Philadelphia, Pa.
- Taylor Instrument Companies, Rochester, N. Y.
- Wilson Products, Inc., Reading, Pa.

ANGLES, BARS, BEAMS, CHANNELS AND TEES (LIGHT WEIGHT SHAPES)

- Aluminum Company of America, Pittsburgh, Pa.
- ●American Brass Co., Waterbury, Conn.
- Bethlehem Steel Co., Bethlehem, Pa.
- Byers Co., A. M., Pittsburgh, Pa.
- ●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
- Chase Brass & Copper Co., Inc., Waterbury, Conn.
- Colonial Alloys Co., Philadelphia.
- ●Columbia Steel Co., San Francisco, Cal.
- Inland Steel Co., Chicago, Ill.
- International Steel Co., Evansville, Ind.
- Jones & Laughlin Steel Corp., Pittsburgh, Pa.
- Laclede Steel Co., St. Louis, Mo.
- Lukens Steel Co., Coatesville, Pa.
- ●Milcor Steel Co., Milwaukee, Wis.
- National Lead Co., New York City.
- ●Republic Steel Corp., Cleveland, O.
- Revere Copper and Brass Incorporated, New York City.
- Stran-Steel Division, Great Lakes Steel Corp., Detroit, Mich.
- ●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
- Truscon Steel Co., Youngstown, O.
- Weirton Steel Co., Weirton, W. Va.
- ●Youngstown Sheet & Tube Co., Youngstown, O.

ARC WELDERS

See Welders, Arc

ASBESTOS PAPER

See Paper, Asbestos

ATTIC FANS

See Fans, Night Air Cooling

AUTOMATIC HUMIDIFIERS

See Humidifiers, Furnace, Evaporation, Spray

BAND SAWS

See Saws, Band, Sheet Metal Cutting

BARS

See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)

BASES AND PADS, VIBRATION ISOLATING

- Armstrong Cork Co., Lancaster, Pa. (Cork)
- Bishop & Babcock Mfg. Co., Cleveland.
- Buffalo Forge Co., Buffalo, N. Y.
- Butterworth, B. T., Jr., New Canaan, Conn.
- ●Clarage Fan Co., Kalamazoo, Mich.
- Cork Import Corp., New York City (Cork)
- Cork Insulation Co., Inc., New York, N. Y.
- Crown Cork & Seal Co., Baltimore.
- Fabling Co., W. D., Los Angeles, Cal.
- Felters Co., Inc., Boston.
- Firestone Tire & Rubber Co., Akron, O.
- Gates Rubber Co., Denver, Colo.
- Goodrich Co., B. F., Akron, O. (Rubber)
- Keldur Corporation, New York City.
- Korfund Co., Inc., Long Island City, N. Y.
- Lord Mfg. Co., Erie, Pa.
- Manley Products Corp., York, Pa.
- Mundet Cork Corp., New York City.
- National Lead Co., New York City.
- United Cork Companies, Kearny, N. J.
- Vibration Eliminator Co., Long Island City, N. Y. (Cork and rubber)
- Western Felt Works, Chicago (Felt)

BEAMS

See Angles, Bars, Beams, Channels and Tees (Light weight Shapes)

BEARINGS, BALL

- Ahlberg Bearing Co., Chicago.
- Bearing Co. of America, Lancaster, Pa.
- Dodge Mfg. Corp., Mishawaka, Ind.
- Fafnir Bearing Co., New Britain, Conn.
- Link-Belt Co., Chicago.
- Marlin-Rockwell, Jamestown, N. Y.
- New Departure Div. General Motors Sales Corp., Bristol, Conn.
- Norma-Hoffman Bearings Corp., Stamford, Conn.
- Schatz Mfg. Co., Poughkeepsie, N. Y.
- Shafer Bearing Corp., Chicago.
- Stephens-Adamson Mfg. Co., Aurora, Ill.
- SKF Industries, Inc., Philadelphia.
- Wood's Sons Co., T. B., Chambersburg, Pa.

BAFFLES, OIL BURNER & STOKER

- Calesco Corporation, Lynn, Mass.
- Jones Products Company, Ferndale, Mich.
- ●McLeod & Henry Co., Inc., Troy, N. Y.
- Munn and Steele, Inc., Newark, N. J.

BEARINGS, PILLOW BLOCK

- Ahlberg Bearing Co., Chicago.
- ●Air Controls Inc., Cleveland.
- Caldwell Co., W. E., Louisville, Ky.
- Chain Belt Co., Milwaukee, Wis.
- Chicago Die Casting Co., Chicago.
- Central Die Casting & Mfg. Co., Inc., Chicago.
- Clizbe Bros. Mfg. Co., Plymouth, Ind.

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Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Goldens' Fdry. & Machine Co., Columbus, Ga.
Hastings Air Conditioning Company, Inc., Hastings, Nebr.
Jones Foundry & Machine Co., W. A., Chicago.
●Lau Blower Co., Dayton, Ohio.
Link-Belt Co., Chicago.
Medart Co., St. Louis.
●Randall Graphite Products Corp., Chicago.
Royersford Foundry & Machine Co., Royersford, Pa.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Shafer Bearing Corp., Chicago.
SKF Industries, Inc., Philadelphia.
Sprout-Waldron & Co., Muncy, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
●Viking Air Conditioning Corp., Cleveland.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

Ahlberg Bearing Co., Chicago.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., New Britain, Conn.
Hyatt Roller Bearing Co., Harrison, N. J.
Jones Foundry & Machine Co., W. A., Chicago.
Link-Belt Co., Chicago.
Medart Co., St. Louis.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co., Royersford, Pa.
Shafer Bearing Corp., Chicago.
SKF Industries, Inc., Philadelphia.
Timken Roller Bearing Co., Canton, Ohio.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Consolidated Metals Corp., Detroit.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Johnson Bronze Co., New Castle, Pa.
Medart Co., St. Louis.
●Randall Graphite Products Co., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELTS, V

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago.
Continental Rubber Works, Erie, Pa.
Dayton Rubber Mfg. Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Gates Rubber Co., Denver, Colo.
Gilmer Co., L. H., Philadelphia, Pa.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Jones Foundry & Machine Co., W. A., Chicago.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J.
Medart Co., St. Louis.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rockwood Mfg. Co., Indianapolis, Ind.
United States Rubber Co., New York City.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Pump & Machinery Corp., Harrisburg, N. J.

BI-METALS, THERMOSTATIC

Chace Co., W. M., Detroit, Mich.
General Plate Co., Attleboro, Mass.
Wilson Co., The, H. A., Newark, N. J.

BLADES, PROPELLER FAN

Aerovent Fan Co., Piqua, Ohio.
●Air Controls, Inc., Cleveland.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Airtherm Manufacturing Co., St. Louis.
●Allen Corp., Detroit.
Autovent Fan & Blower Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit.
Bishop & Babcock Mfg. Co., Cleveland.
Buffalo Forge Company, Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Circulators & Devices Mfg. Corp., New York City.
Dallas Engineering Co., Inc., Dallas, Texas.
DeBothezat Vent. Eq. Div., American Machine & Metals, Inc., East Moline, Ill.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Regulator Corp., Chicago.
Holtum Mfg. Co., Freeport, Ill.
International Engineering, Inc., Dayton, Ohio.
King Ventilating Co., Owatonna, Minn.
Lohman, Inc., William J., New York City.
Marathon Electric Mfg. Corp., Wausau, Wis.
Meier Electric & Machine Co., Indianapolis, Ind.
Metal Stamping & Mfg. Co., Cleveland.
Myers Electric Co., Pittsburgh, Pa.
Norwin Co., Freeport, Ill.
Peerless Electric Co., Warren, O.
Philadelphia Machinery Co., Philadelphia.
Propellair, Inc., Springfield, Ohio.
●Schwitzer-Cummins Company, Indianapolis, Ind.
South Bend Air Products, Inc., South Bend, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Swift Mfg Co., Detroit, Mich.
●Torrington Mfg. Co., Torrington, Conn.
Trane Co., The, LaCrosse, Wis.
Utility Fan Corporation, Los Angeles.
●Victor Electric Products, Inc., Cincinnati, O.

BLOWER—FILTER UNITS

Airtherm Mfg. Co., St. Louis, Mo.
●Berger Bros. Co., Philadelphia, Pa.
Blower Application Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis.
Garden City Fan Co., Chicago, Ill.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Mayville, Wis.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
R-S Products Corp., Philadelphia, Pa.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Western Blower Co., Seattle, Wash.

BLOWER—FILTER UNITS

(Separate, Conversion Units for Warm Air Furnaces)

Agricola Furnace Co., Inc., Gadsden, Ala.
Air Conditioning Equipment Co., Minneapolis, Minn.
●Air Controls, Inc., Cleveland, O.
American Blower Corp., Detroit.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Bard Mfg. Co., Bryan, O.
Barrett Engineers, Cleveland Heights, O.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Bryant Corp., C. L., Cleveland.
Campbell Heating Co., Des Moines, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Comfort Products Corporation, Harvey, Ill.
Conco Corporation, Mendota, Ill.
Dail Steel Products Co., Lansing, Mich.
Economy Baler Co., Ann Arbor, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
●Furblo Co., Hermansville, Mich.
Gehri Co., Tacoma, Wash.
General Blower Corp., San Francisco.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Green Foundry & Furnace Works, Des Moines, Ia.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harvey-Whipple, Inc., Springfield, Mass.
Hastings Air Conditioning Company, Inc., Hastings, Nebr.
Henry Furnace & Foundry Co., Cleveland, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Kelsey Heating Co., Syracuse, N. Y.
●Lau Blower Co., Dayton, O.
Lennox Furnace Co., Marshalltown, Ia.
●Majestic Co., Huntington, Ind.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Marion Furnace Co., Detroit.
Marshall Furnace Co., Marshall, Mich.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit.
Olsen Mfg. Co., C. A., Elyria, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.

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●Payne Furnace & Supply Co., Beverly Hills, Cal.
Peerless Electric Co., Warren, O.
●Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Furnace & Iron Co., Warren, Pa.
●Premier Furnace Co., Dowagiac, Mich.
Roberts-Hamilton Co., Minneapolis, Minn.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●St. Louis Furnace Mfg. Co., St. Louis.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sioux City Foundry and Boiler Co., Sioux City, Ia.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Star Radiator Co., Los Angeles.
Todd Air Conditioning Co., Inc., Bonner Springs, Kan.
●U. S. Air Conditioning Corp., Minneapolis.
●Viking Air Conditioning Corp., Cleveland, O.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Williamson Heater Co., Cincinnati, O.

BLOWER—WASHER UNITS, FOR CLEANING OR HUMIDIFYING

(Separate Conversion Units for Warm Air Furnaces)

American Blower Corporation, Detroit.
●American Foundry & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Ia.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Dail Steel Products Co., Lansing, Mich.
Economy Baler Co., Ann Arbor, Mich.
●Hess Warming & Ventilating Co., Chicago.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Peerless Electric Co., Warren, O.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Utica Radiator Corporation, Utica, N. Y.
●Waterman-Waterbury Co., Minneapolis, Minn.

BLOWERS, FORCED DRAFT, FOR ASH PIT

American Blower Corp., Detroit.
Barrett Engineers, Cleveland Heights, O.
Bignall Co., Medina, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Burnwell Corp., Allentown; Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Economy Electric Mfg. Co., Cicero, Ill.
Garden City Fan Co., Chicago.
General Blower Co., Philadelphia.
●Henry Furnace & Fdy. Co., Cleveland.
International Engineering, Inc., Dayton, O.
Mohler Co., J. K., Ephrata, Pa.
South Bend Air Products, Inc., South Bend, Ind.
Sturtevant Co., B. F., Hyde Park, Boston.
Universal Blower Co., Birmingham, Mich.

BLOWERS, FORCED DRAFT, FOR SMOKE PIPE

Barrett Engineers, Cleveland Heights, O.
DeBothezat Ventilating Equip. Div., American Machine & Metals, Inc., East Moline, Ill.
Muncie Gear Works, Muncie, Ind.

BLOWERS, FURNACE CENTRIFUGAL

Agricola Furnace Co., Inc., Gadsden, Ala.
Air Conditioning Equipment Co., Minneapolis, Minn.
●Air Controls, Inc., Cleveland, O.
Alladdin Heating Corporation, Oakland, Cal.
American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Ames Co., W. R., San Francisco, Cal.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Champion Blower & Forge Co., Lancaster, Pa.
●Chandler Co., Cedar Rapids, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
●Clarage Fan Co., Kalamazoo, Mich.
Economy Baler Co., Ann Arbor, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
●Furblo Co., Hermansville, Mich.
Gehri Co., Tacoma, Wash.
General Blower Co., Philadelphia, Pa.
General Blower Corp., San Francisco.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
●Henry Furnace & Foundry Co., Cleveland.
●Hess Warming & Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
●Lau Blower Co., Dayton, O.
Lennox Furnace Co., Marshalltown, Iowa.
●Majestic Co., Huntington, Ind.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit.
Nelson Corp., Herman, Moline, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
●Premier Furnace Co., Dowagiac, Mich.
Reynolds Mfg. Co., Grand Rapids, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Security Stove & Mfg. Co., Kansas City, Mo.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Sturtevant Co., B. F., Hyde Park, Boston.
Todd Air Conditioning Co., Inc., Bonner Springs, Kan.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utility Fan Corporation, Los Angeles, Cal.
●Viking Air Conditioning Corp., Cleveland, O.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.
●Williamson Heater Co., Cincinnati, O.

BLOWERS, VENTILATING SYSTEM

(Capacity 4,000 c.f.m. up)

Advance Fan & Blower Co., Detroit, Mich.
●Air Controls, Inc., Cleveland, O.
Airtherm Mfg. Co., St. Louis.
Allen Billmyre Corp., South Norwalk, Conn.
Alladdin Heating Corporation, Oakland, Cal.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
●American Foundry & Furnace Co., Bloomington, Ill.
Ames Co., W. R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Autovent Fan & Blower Co., Chicago, Ill.
Ballantyne Co., Omaha, Nebr
Bayley Blower Co, Milwaukee, Wis
Bishop & Babcock Mfg Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., E.-K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Vent. Co., Columbus, O.
Coppus Engineering Corp., Worcester, Mass.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago.
●Furblo Co., Hermansville, Mich.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Philadelphia, Pa.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Ilg Electric Ventilating Co., Chicago, Ill.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
Johnson Fan & Blower Corp., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
●Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Mountain States Equipment Co., Denver, Colo.
National Manufacturing & Engineering Co., Detroit.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York City.
Northern Blower Co., Cleveland, Ohio.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, Ohio.
Phelps Mfg. Co., 801 Thomas St., Little Rock, Ark.
Propellair, Inc., Springfield, Ohio.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Smith Heater Co., Peter, Detroit, Mich.
Spray-Wheel Air Conditioners, Inc., Denver Colo.
Star Radiator Company, Los Angeles, Cal.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Heater & Ventilating Corp., St. Louis, Mo.
Todd Air Conditioning Co., Inc., Bonner Springs, Kans.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utility Fan Corporation, Los Angeles, Cal.
●Viking Air Conditioning Corp., Cleveland.
Western Blower Co., Seattle, Wash.
Wing Mfg. Co., L. J., New York City.
Wolverine Blower Works, Grand Rapids, Mich.

BLOW PIPE EQUIPMENT

See Blast Gates; Collectors, Blow Pipe; Fittings, Blow Pipe

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BOLTS, EXPANSION

Paine Co., The, Chicago.
U. S. Expansion Bolt Co., Inc., York, Pa.

BOLTS, TOGGLE AND ANCHOR

Paine Co., The, Chicago.
U. S. Expansion Bolt Co., Inc., York, Pa.

BOOTS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

BRAKES, METAL WORKERS', HAND

Bath Company, Cyril J., Cleveland.
Bertsch & Co., Cambridge City, Ind.
●Dreis & Krump Mfg. Co., Chicago, Ill.
Elker Mfg. Co., Ogallala, Nebr.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Steelweld Machinery Co., Cleveland, O.
●Whitney Metal Tool Co., Rockford, Ill.
Weiss & Co., H., New York City.

BRAKES, METAL WORKERS', PORTABLE

●Dreis & Krump Mfg. Co., Chicago.
Elker Mfg. Co., Ogallala, Nebr.
Harris, A. R., Hammond, Ind.
●Whitney Metal Tool Co., Rockford, Ill.

BRAKES, METAL WORKERS', POWER

Bath & Co., Cyril, Cleveland.
Bertsch & Co., Cambridge City, Ind.
●Cincinnati Shaper Co., Cincinnati, O.
●Dreis & Krump Mfg. Co., Chicago, Ill.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Ohl & Co., Geo. A., Newark, N. J.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.
Verson Allsteel Press Co., Chicago.
Weiss & Co., H., New York City.
●Whitney Metal Tool Co., Rockford, Ill.

BRUSHES, ACID

Cleveland Brush Factory, Inc., Cleveland, O.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
●Meyer & Bro. Co., F., Peoria, Ill.
Milwaukee Brush Mfg. Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, O.
Potomac Mfg. Co., Philadelphia, Pa.
Schaefer Brush Mfg. Co., Milwaukee, Wis. (Rustproof)
Weiss & Co., H., New York City.

BRUSHES, FURNACE

Adams Company, The, Dubuque, Iowa.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Mill-Rose Co., Cleveland, O.
Milwaukee Brush Mfg. Co., Milwaukee, Wis.
Osborn Mfg. Co., Cleveland, O.
Pilley Packing & Flue Brush Mfg. Co., St. Louis, Mo.
Schaefer Brush Mfg. Co., Milwaukee, Wis.
Swift Corp., Carl E., Holland, Mich.
Worcester Brush & Scraper Co., Worcester, Mass.

BUFFERS, GRINDERS, POLISHERS AND SANDERS, ELECTRIC

Black & Decker Mfg. Co., Towson, Md.
Buckeye Portable Tool Co., Dayton, O.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Electrical Tool Co., Cincinnati, O.
Clark Jr. Electric Co., Jas., Louisville, Ky.
Detroit Surfacing Machine Co., Detroit.
Diehl Mfg. Co., Elizabethport, N. J.
Hammond Machinery Builders, Kalamazoo, Mich.
Haskins Co., R. G., Chicago.
Hobart Brothers Company, Troy, O.
Independent Pneumatic Tool Co., Chicago, Ill.
Keller, Inc., Wm. H., Grand Haven, Mich.
Lee & Son Co., K. O., Aberdeen, S. D.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y.
Reynolds Electric Company, Chicago.
Skilsaw, Inc., Chicago, Ill.
Speedway Mfg. Co., Cicero, Ill.
Snap-On Tools Corp., Kenosha, Wis.
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
Stow Mfg. Co., Binghampton, N. Y.
United States Electrical Tool Co., Cincinnati, O.
U. S. Electrical Motors, Inc., Los Angeles.
Van Dorn Electric Tool Co., Towson, Md.
●Wodack Electric Tool Corp., Chicago, Ill.

BURNERS, GAS, CONVERSION, RESIDENTIAL

Auburn Burner Co., Auburn, Ind.
Autogas Corp., Chicago.
●Barber Gas Burner Co., Cleveland O.
Beck Engineering Combustion Kompany, St. Louis Mo.
Bryan Steam Corp., Peru, Ind.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
Burdett Mfg. Co., Chicago, Ill.
Columbia Burner Co., Toledo, O.
Continental Stove Corp., Ironton, O.
Franklin Gas Heating Co., Cincinnati, Ohio.
Handley-Brown Heater Co., Jackson, Mich.
Hudson-Root Company, Brocton, N. Y.
●Johnson Gas Appliance Co., Cedar Rapids, Iowa.
Kais Sunrise Works, Detroit.
Leahy Mfg. Co., Los Angeles, Cal.
Martin, J. O. & C. U., San Francisco.
Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.
National Machine Works, Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Cal.
Security Stove & Mfg. Co., Kansas City, Mo.
Sonner Burner Co., Winfield, Kans.
Standard Heating & Radiator Co., Pittsburgh, Pa.
●Surface Combustion Corp., Toledo, O.
Vacuum Gas Burner Corp., Olean, N. Y.
Webster Engineering Co., Tulsa, Okla.
Zinc Co., John, Tulsa, Okla.

BURNERS, OIL, CONVERSION, RESIDENTIAL

Ace Engineering Co., Chicago, Ill. (Rotary)
Acme Oil Burner Company, Inc., Cedar Rapids, Ia. (Gun)
Air-n-Oil Burners and Heating Utilities, Inc., Brooklyn, N. Y.
●Airtemp Division, Chrysler Corp., Dayton, Ohio.
●Aldrich Co., Peoria, Ill.
●American Radiator & Standard Sanitary Corp., New York City and Pittsburgh. (Gun)
Arcweld Mfg. Co., Inc., Seattle, Wash.
Auburn Burner Co., Auburn, Ind. (Gun and rotary)
Autocrat Oil Burner Corp., Cedar Rapids, Ia.
Auto-Heat Corp., New York City. (Gun)
Automatic Burner Corp., Chicago, Ill. (Gun and rotary)
Badger Mfg. Co., Madison, Wis. (Gun)
●Beckett Engineering Co., R. W., Elyria, Ohio.
Bennett Co., Omaha, Nebr. (Gun)
Berryman Oil Burner Co., Chicago, Ill. (Gun, Gravity and Rotary)
Bethlehem Foundry & Machine Co., Bethlehem, Pa. (Gun)
Braden Engineering, Inc., Providence, R. I. (Pressure gun)
Brigham Oil Burner Co, St. Louis, Mo. (Gravity)
Bryan Steam Corp., Peru, Ind. (Rotary and gun)
Calesco Corporation, Lynn, Mass. (Gun and gravity)
Caloroil Burner Corp., Hartford, Conn. (Atmospheric, gun, horizontal rotary, vacuum pressure, wall flame)
Campbell Machine Co., Minneapolis.
Cary Mfg. Co., Waupaca, Wis. (Gravity)
Carrier Corp., Syracuse, N. Y.
●Century Engineering Corp., Cedar Rapids, Ia. (Gun)
Chalmers Oil Burner Co., Minneapolis, Minn. (Gun)
Chicago Steel Furnace Co., Chicago, Ill.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland, O. (Gun and rotary)
Columbus Metal Products, Inc., Columbus, Ohio. (Gravity)
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
D'Elia Oil Burner Co., Inc., Bridgeport, Conn. (Gun)
Easternoil, Inc., Portland, Me. (Gun)
Electrol, Incorporated, Clifton, N. J.
Excello Oil Heating Corp., Omaha, Nebr.
●Excelsior Steel Furnace Co., Chicago.
Fairfield Oil Heating Co., Inc., Greenwich, Conn. (Gun)
Fargo Foundry Co., Fargo, N. D. (Gun)
Florence Stove Co., Gardner, Mass.
Fluid Heat Division, Anchor Post Fence Co., Baltimore. Gun and Rotary)
Gasoroil Furnace Co., Chicago, Ill.
●General Electric Co., Bloomfield, N. J.
General Oil Heating Corp., West New York, N. J. (Gun)
Gilbert & Barker Mfg. Co., Springfield, Mass. (Gun)
Gold Star Oil Burner Mfg. Co., Inc., Yonkers, N. Y. (Gun)
Green Foundry & Furnace Works, Des Moines, Ia. (Gun)

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Hall-Neal Furnace Co., Indianapolis, Ind.
Hardinge Oil Burner Co., Chicago, Ill.
Hart Oil Burner Corp., Peoria, Ill. (Gun)
Harvey-Whipple, Inc., Springfield, Mass. (Gun)
Heatseal Burner Co., Omaha, Nebr.
●Heil Co., Milwaukee, Wis. (Gun)
●Herco Oil Burner Corp., Lancaster, Pa.
●Hess Warming and Ventilating Co., Chicago, Ill.
Hipoint Corp., Bellefontaine, O.
Holtum Mfg. Co., Freeport, Ill. (Gun)
Hotentot Co., Inc., Omaha, Nebr. (Gun)
Hubbard Co., Minneapolis, Minn. (Gun)
Iowa Foundry Co., Sioux City, Ia.
Jacobsen Mfg. Co., Racine, Wis. (Gun)
●Johnson Co., S. T., Oakland, Cal., and Philadelphia. (Gun)
Johnson Mfg. Co., Waterloo, Ia. (Gun)
Johnston Mfg. Co., Minneapolis, Minn. (Gun)
Kais Sunrise Works, Detroit, Mich. (Gravity and rotary)
Kaybar Burner Corp., Chicago, Ill.
Keith Furnace Co., Des Moines, Ia. (Gun)
Kelvinator Div., Nash-Kelvinator Corp., Detroit. (Gun)
Kleen Heet, Inc., Chicago, Ill. (Gun and Gravity)
Korth Oil Burner Corp., Roselle Park, N. J. (Rotary and gun)
Laco Oil Burner Co., Griswold, Ia. (Gun and Gravity)
Landwehr Heating Corp., Philadelphia, Pa.
Leahy Mfg. Co., Los Angeles, Cal.
Leeson Co., T. F., Detroit, Mich. (Gun)
Lennox Furnace Co., Marshalltown, Iowa.
Little Burner Co., Inc., H. C., San Rafael, Cal. (Gravity)
Littleford Bros., Cincinnati, O.
Macrae, Inc., Brooklyn.
Mahan Oil Burner & Furnace Co., Elmhurst, Ill. (Gravity)
●Majestic Co., Huntington, Ind.
Malleable Iron Fittings Co., Banford, Conn. (Gun)
May Oil Burner Corp., Baltimore, Md. (Gun)
Mayflower Oil Burner Corp., West New York, N. J. (Gun)
●Meyer Furnace Co., Peoria, Ill.
Micro-Westco, Inc., Bettendorf, Iowa.
Montag Stove & Furnace Works, Portland, Ore. (Gun)
National Airoil Burner Co., Philadelphia, Pa. (Gun)
National Iron Works, San Diego, Cal.
Nelson Corp., Herman, Moline, Ill. (Gun)
●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
Nu-Way Corp., Rock Island, Ill.
Olsen Mfg. Co., C. A., Elyria, O. (Gun)
Pan American Engineering Company, Berkeley, Cal. (Gun, rotary and turbine)
Paragon Oil Burner Corp., Brooklyn, N. Y.
Par Appliances, Inc., LaCrosse, Wis. (Gravity Forced Draft)
Peerless Oil Burner Co., Inc., Kansas City, Mo. (Gravity)
●Penn Boiler & Burner Mfg. Corp., Lancaster, Pa. (Gun)
Peoples Oil Burner Co., Chicago, Ill. (Gravity)
Petroleum Heat & Power Co., Stamford, Conn. (Rotary and gun)
Pioneer Manufacturing Co., Cedar Rapids, Ia.
Preferred Utilities Manufacturing Corp., New York City.
Pressure Oil Burners, Inc., York, Pa. (Gun)
Quaker Mfg. Co., Chicago.
Quiet Heet Burner Co., Brooklyn, N. Y.
R-S Products Corp., Philadelphia, Pa. (Gun)
Ray Oil Burner Co., San Francisco, Cal. (Gun, gravity and rotary)
Reif-Rexoil, Inc., Buffalo, N. Y.
Rotary Mfg. Co., Los Angeles, Cal. (Rotary)
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Scott-Newcomb, Inc., St. Louis, Mo. (Gun)
Season-Aire Corporation of America, Detroit.
Sentry Mfg. Co., Omaha, Nebr. (Gun)
Shedlov Oil Burners, Inc., Minneapolis, Minn. (Gravity, gun)
Silent Glow Oil Burner Corp., Hartford, Conn.
Silent Sioux Oil Burner Corp., Orange City, Ia. (Gravity)
Simplex Oil Heating Corp., New York City. (Gun, rotary and turbine)
Skinner Co., E. W., Fitchburg, Mass. (Gravity)
Summerheat Co., South Bend, Ind. (Low pressure)
Sundstrand Engineering Co., Rockford, Ill. (Gun)
Sun-Ray Oil Burner Corp., Rockaway Park, N. Y. (Gun)
Syncro-Flame Burner Corp., Willimantic, Conn. (Gun, rotary)
Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit. (Gun and rotary)
Todd Combustion Equipment, Inc., New York City.
Uni-Fire Co., Detroit, Mich. (Rotary)
United States Burner Corp., Hartford, Conn. (Gun and rotary)
Valley Mfg. Co., Athol, Mass. (Gun and rotary)
Victor Oil Burner Mfg. Co., Hartford, Conn. (Gravity)
Viking Mfg. Co., Seville, O. (Gun and Gravity)
Volcano Burner Corp., New York City. (Gun)
Vortex Mfg. Co., Portland, Ore.
●Waterman-Waterbury Co., Minneapolis. (Gun)
Wayne Oil Burner Corp., Fort Wayne, Ind. (Gun)
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Westwick & Son, Inc., John, Galena, Ill. (Gun)
Williams Oil-O-Matic Heating Corp., Bloomington, Ill. (Gun)
●Wood Industries, Inc., Gar, Detroit, Mich. (Gun)
Woolery Machine Co., Minneapolis, Minn. (Gun)
York Ice Machinery Corp., York, Pa.
York Oil Burner Co., Inc., York, Pa. (Gun)

CABINETS AND CASINGS

Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.
Brundage Co., Kalamazoo, Mich.
●Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Metal Mfg. Co., Chicago.
Columbus Heating & Ventilating Co., Columbus, Ohio.
Falstrom Co., Passaic, N. J.
General Blower Corp., San Francisco.
General Metal Products Co., St. Louis, Mo.
Hauserman Co., E. F., Cleveland.
●Lau Blower Co., Dayton, Ohio.
Maysteel Products, Inc., Mayville, Wis.
Mullins Mfg. Corp., Warren, Ohio.
National Manufacturing & Engineering Co., Detroit.
●Republic Steel Corp., Cleveland.
●Riester & Thesmacher Co., Cleveland.
St. Charles Mfg. Co., St. Charles, Ill.
St. Louis Blow Pipe & Heater Co., St. Louis.
Steinhorst & Sons, Inc., Emil, Utica, N. Y.

CAPS AND TOPS, CHIMNEY

●Accurate Mfg. Works, Chicago, Ill.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Adams Company, The, Dubuque, Ia.
●Allen Corp., Detroit, Mich.
Ames Co., W. R., San Francisco, Cal.
Chicago Metal Mfg. Co., Chicago, Ill.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Excelsior Steel Furnace Co., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Iwan Brothers, South Bend, Ind.
Lamb & Ritchie Co., Cambridge, Mass.
Little Burner Co., Inc., H. C., San Rafael, Cal.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Neemes Foundry, Inc., Troy, N. Y.
●Osborn Co., J. M. & L. A., Cleveland.
Royal-Apex Mfg. Corp., Brooklyn.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Sterling Foundry Company, Sterling, Ill. (Cast iron)
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Vail Mfg. Co., Fort Wayne, Ind.

CASINGS

See Cabinets and Casings

CEILINGS, METAL

Berger Mfg. Div., Republic Steel Corp., Canton, O.
Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
Canton Steel Ceiling Mfg. Co., Canton, O.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Edwards Mfg. Co., Inc., Cincinnati, O.
Friedley-Voshardt Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Martin-Parry Corp., York, Pa.
Mesker & Co., Geo. L., Evansville, Ind.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada Mo.
Reeves Steel & Mfg. Co., Dover, O.
●Republic Steel Corporation, Cleveland.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Southern States Iron Roofing Co., Savannah, Ga.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Wheeling Corrugating Co., Wheeling, W. Va.
Woolwine Metal Products Co., Los Angeles, Cal.

CEMENT, FURNACE

●Armstrong Co., Detroit, Mich.
Buckeye Products Co., Cincinnati, O.
Carey Co., Philip, Lockland, Cincinnati, O.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Continental Products Co., Euclid, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
Hercules Chemical Co., Inc., New York City.
Hetzel Roofing Products Co., Newark, N. J.
Johns-Manville, New York City.
Keasbey Co., Robert A., New York City. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.

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●McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Ramtite Co., Chicago, Ill.
Refractory & Insulation Corp., New York City..
Ruberoid Co., New York City.
Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Sauereisen Cements Co., Sharpsburg, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Walsh Refractories Corp., St. Louis, Mo.
Wilhelm Co., A., Reading, Pa.
●Wilson, Inc., Grant, Chicago, Ill.

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago.
Baldwin-Hill Co., Trenton, N. J. (Rockwool)
Carey Co., Philip, Cincinnati, Ohio.
Chicago Fire Brick Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y.
Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
General Insulating & Mfg. Co., St. Louis.
Industrial Research, Lansdowne, Pa.
International Vermiculite Co., Springfield, Ill. (Vermiculite)
Johns-Manville, New York City (Asbestos)
Keasbey Co., Robert A., New York City. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Krehbiel Co., J. H., Chicago (Asbestos, mineral wool)
●McLeod & Henry Co., Inc., Troy, N. Y.
Minfelt Insulation Co., Toledo, O.
Munn and Steele, Inc., Newark, N. J. (Vermiculite)
National Engineering Products, Inc., Washington, D. C.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Owens-Corning Fiberglas Corp., Toledo, Ohio.
Pecora Paint Co., Philadelphia.
Pyrolite Products Co., Cleveland, O.
Ramtite Co., Div. of S. Obermayer Co., Chicago.
Refractory & Insulation Corp., New York City. (Wool)
Ruberoid Co., New York City. (Asbestos)
Rutland Fire Clay Co., Rutland, Vt. (Asbestos)
Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Joliet, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit.
Standard Lime & Stone Co., Baltimore.
Therminsul Corp., Kalamazoo, Mich.
Thompson & Co., Pittsburgh, Pa.
United States Gypsum Co., Chicago. (Asbestos)
United States Mineral Wool Co., Chicago. (High temperature mineral wool cement)
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
●Wilson, Inc., Grant, Chicago, Ill.

CEMENT, ROOF

Acme Asbestos Covering & Flooring Co., Chicago.
Acme Refining Co., Cleveland, O. (Liquid and plastic)
Acorn Refining Co., Cleveland.
All States Roofers Equipment & Material Co., Chicago, Ill.
●Armstrong Co., Detroit.
Barber Co., Inc., Philadelphia, Pa.
Barber Asphalt Corp., Barber, N. J.
Barrett Co., New York City.
Bird & Son, Inc., East Walpole, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Co., Philip, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Celotex Corp., Chicago.
Certain-teed Products Corp., New York City.
Clinton Metallic Paint Co., Clinton, N. Y.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Flintkote Co., New York City.
Ford Roofing Products Co., Chicago.
Glidden Co., Cleveland, O.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)
Johns-Manville, New York City.
Klee Co., Geo. B., Cincinnati.
Koppers Company, Pittsburgh.
Krehbiel Co., J. H., Chicago.
Lastik Products Co., Inc., Pittsburgh, Pa.
Miller & Son, C. Arthur, Elmira, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa. (Asbestos)
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Ruberoid Co., New York City.
Rutland Fire Clay Co., Rutland, Vt.
●Surface Combustion Corp., Toledo, O.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
United States Gypsum Co., Chicago, Ill.
Wilhelm Co., A., Reading, Pa.

CHAIN, FURNACE

American Chain & Cable Co., Inc., Bridgeport, Conn.
●Bead Chain Mfg. Co., Bridgeport, Conn.
Bridgeport Chain & Mfg. Co., Bridgeport, Conn.
Chain Products Co., Cleveland, O.
Corbin Screw Corp., New Britain, Conn.
●Hart & Cooley Mfg. Co., Chicago, Ill.
McKay Co., Pittsburgh.
Russell Mfg. Co., John M., Naugatuck, Conn.
●Surface Combustion Corp., Toledo, O.
Turner & Seymour Mfg. Co., Torrington, Conn.

CHANNELS

See Angles, Bars, Beams, Channels and Tees (Light Weight Shapes)

CLEANERS, VACUUM, FURNACE

Baker Furnace & Cleaner Mfg. Co., Toledo, O.
●Breuer Electric Mfg. Co., Chicago, Ill.
Brillion Furnace Co., Brillion, Wis.
Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Densmore-Quinlan Co., Kenosha, Wis.
Dickson & Eddy, New York City.
●Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
●Electric Vacuum Cleaner Co., Inc., Cleveland, O.
Ideal Commutator Dresser Co., Sycamore, Ill.
Kent Co., Inc., Rome, N. Y.
National Super Service Co., Toledo, O.
Spencer Turbine Co., Hartford, Conn.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Swift Corp., Carl E., Holland, Mich.

CLIPS, FASTENING, FOR ROOFING

American Sheet Metal Works, New Orleans, La.
Bard Manufacturing Co., Bryan, O.
●Berger Brothers Co., Philadelphia, Pa.
Bird & Son, Inc., East Walpole, Mass.
Bridesburg Foundry Co., Philadelphia, Pa.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
National Stainless Clip Corp., New York City. (Stainless)
●Osborn Co., J. M. & L. A., Cleveland, O.
Pfeifer, Wm., New York City.
Southbridge Roofing Co., Inc., Southbridge, Mass.

CLIPS AND TIPS, DAMPER

Adams Company, The, Dubuque, Ia.
●Air Control Products, Inc., Muskegon, Mich.
●Berger Bros. Co., Philadelphia, Pa.
●Goese Mfg. Co., Milwaukee.
●Gerett Co., M. A., Milwaukee.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Griswold Mfg. Co., Erie, Pa.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Howes Co., S. M., Charlestown, Boston, Mass.
Kerentoff, G. L., Cincinnati.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Stover Mfg. & Engine Co., Freeport, Ill.
Young Regulator Co., Cleveland, O.

COAL BURNERS, AUTOMATIC

See Stokers

COATINGS, PROTECTIVE, METAL

Metalizing Co., Los Angeles, Cal.
White & Co., Haydn F., Cleveland, O.

COILS, COOLING, DIRECT EXPANSION, FINNED

Acme Industries, Inc., Jackson, Mich.
American Coils, Inc., Newark, N. J.
Aerofin Corp., Syracuse, N. Y.
Beacon-Morris Corp., Boston, Mass.
Bohn Aluminum & Brass, Detroit.

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Bush Mfg. Co., Hartford, Conn.
Conditionaire Unit Co., Chicago.
Drayer & Hanson, Inc., Los Angeles, Cal.
Fedders Mfg. Co., Buffalo, N. Y.
●G & O Mfg. Co., New Haven, Conn.
●General Electric Co., Bloomfield, N. J.
General Refrigeration Corporation, Beloit, Wis.
Griscom-Russell Co., The, New York City.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard, Inc., Sam, St. Louis.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
McCord Radiator & Mfg. Co., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Manufacturers Fin Coil Co., Chicago.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Mojonnier Brothers Co., Chicago.
Ohio Pipe Bending & Machine Co., Cleveland.
Peerless of America, Inc., Chicago.
Perfex Corporation, Milwaukee.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Sharpsburg Sta., Pittsburgh.
Rome-Turney Radiator Co., Rome, N. Y.
Standard Galvanizing Co., Chicago, Ill.
Sturtevant Co., B. F., Hyde Park, Boston.
Super Radiator Corp., Minneapolis.
Tilco-Fin, Inc., Brooklyn, N. Y.
Trane Co., La Crosse, Wis.
Unit Heater & Cooler Co., Wausau, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Yates-American Machine Co., Beloit, Wis.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COILS, COOLING, WATER

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
Alpha Metal & Rolling Mills, Inc., Brooklyn.
American Coils, Inc., Newark, N. J.
Beacon-Morris Corp., Boston, Mass.
Bohn Aluminum & Brass, Detroit, Mich.
Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Drayer & Hanson, Inc., Los Angeles.
Fedders Mfg. Co., Buffalo, N. Y.
●G & O Mfg. Co., New Haven, Conn.
●General Electric Co., Bloomfield, N. J.
General Refrigeration Corporation, Beloit, Wis.
Griscom-Russell Co., The, New York City.
Johnson Fan & Blower Corp., Chicago.
Kauffman Air Conditioning Corp., St. Louis.
Kennard, Inc., Sam, St. Louis.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
McCord Radiator & Mfg. Co., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Manufacturers Fin Coil Co., Chicago.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Mojonnier Brothers Co., Chicago.
Peerless of America, Inc., Chicago, Ill.
Perfex Corporation, Milwaukee.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Roessing Mfg. Co., Sharpsburg Sta., Pittsburgh.
Rome-Turney Radiator Co., Rome, N. Y.
Standard Galvanizing Co., Chicago, Ill.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Star Radiator Co., Los Angeles, Cal.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Super Radiator Corp., Minneapolis.
Tilco-Fin, Inc., Brooklyn, N. Y.
Trane Co., La Crosse, Wis.
Unit Heater & Cooler Co., Wausau, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
Yates-American Machine Co., Beloit, Wis.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COILS, FIRE POT, HOT WATER

Adams Company, The, Dubuque, Iowa.
●Air Controls, Inc., Cleveland, O.
American Furnace & Foundry Co., Milan, Mich.
Bell & Gossett Co., Chicago.
●Brauer Supply Co., A. G., St. Louis.
Deshler Foundry & Machine Works, Deshler, O.
Devlin Mfg. Co., Thos., Burlington, N. J.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Globe Machinery & Supply Co., Des Moines, Ia.
Harvey-Whipple Inc., Springfield, Mass.
Hotstream Heater Co., Cleveland, O.
Kitson Co., Philadelphia, Pa.
Liberty Foundry Co., St. Louis, Mo.
Marshall Furnace Co., Marshall, Mich.
Melbye Bros., Inc., Chicago, Ill.
Metzner Stove Repair Co., Kansas City, Mo.
Miller & Son, C. Arthur, Elmira, N. Y.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Rudy Furnace Co., Dowagiac, Mich.
Taco Heaters, Inc., New York City.
Unit Heater & Cooler Co., Wausau, Wis. (Cast Iron)

COILS, HEATING

Aerofin Corp., Syracuse, N. Y.
American Coils, Inc., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Beacon-Morris Corporation, Boston, Mass.
Bohn Aluminum & Brass, Detroit.
Bush Mfg. Co., Hartford, Conn.
Campbell Heating Co., E. K., Kansas City, Mo.
Drayer & Hanson, Inc., Los Angeles.
Fedders Mfg. Co., Buffalo.
●G & O Mfg. Co., New Haven, Conn.
●General Electric Co., Bloomfield, N. J.
Johnson Fan & Blower Corp., Chicago.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Kennard, Inc., Sam, St. Louis.
McCord Radiator & Mfg. Co., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Manufacturers Fin Coil Co., Chicago.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago.
Niagara Blower Co., New York City.
Peerless of America, Inc., Chicago, Ill.
Perfex Corporation, Milwaukee.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Star Radiator Co., Los Angeles, Cal.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Super Radiator Corp., Minneapolis.
Tilco-Fin, Inc., Brooklyn, N. Y.
Trane Co., La Crosse, Wis.
Unit Heater & Cooler Co., Wausau, Wis.
Wing Mfg. Co., L. J., New York City.
York Ice Machinery Corp., York, Pa.
Young Radiator Co., Racine, Wis.

COLLECTORS, BLOW PIPE

Airtherm Mfg. Co., St. Louis, Mo.
Allen Billmyre Corp., South Norwalk, Conn.
●American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., Detroit.
American Foundry Equipment Co., Mishawaka, Ind.
Bayley Blower Co., Milwaukee, Wis.
Belanger Fan & Blower Co., Detroit.
Blower Application Co., Milwaukee, Wis.
Bubar, Hudson, H., New York City.
Buffalo Forge Co., Buffalo, N. Y.
Clark Dust Control Company, Chicago.
Day Co., Minneapolis, Minn.
Dracco Corp., Cleveland, O.
Falstrom Co., Passaic, N. J.
Garden City Fan Co., Chicago, Ill.
Goethel Co., Alfred C., Milwaukee, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knickerbocker Co., Jackson, Mich.
Martin Metal Mfg. Co., Wichita, Kan.
New York Blower Co., Chicago, Ill.
Northern Blower Co., Cleveland, O.
Pangborn Corp., Hagerstown, Md.
Prat-Daniel Corp., Port Chester, N. Y.
Puhl & Hepper Mfg. Co., Inc., St. Louis.
Research Corp., New York City.
Ruemelin Mfg. Co., Milwaukee.
St. Louis Blow Pipe & Heater Co., St. Louis.
Schneible Co., Claude B., Chicago.
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldon Co., Muncy, Pa.
Sly Mfg. Co., W. W., Cleveland, O.
Steamaire Co., Cincinnati, O.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Sturtevant Mill Co., Dorchester, Boston.
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles.
Young & Bertke Co., Cincinnati, O.

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COMPOUNDS, CAULKING

Accurate Metal Weather Strip Co., New York City.
Acme Refining Co., Cleveland, O.
Alimetal Weatherstrip Co., Chicago, Ill.
Alpha Metal & Rolling Mills, Inc., Brooklyn.
American Metal Weather Strip Co., Grand Rapids, Mich.
●Armstrong Co., Detroit.
Asphalt Products Co., Syracuse, N. Y.
Barland Weatherstrip Material Co., Cleveland.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Co., Philip, Cincinnati, O.
Chamberlin Metal Weatherstrip Co., Detroit.
Clinton Metallic Paint Co., Clinton, N. Y.
Continental Products Co., Euclid, O.
Diamond Metal Weather Strip Co., Columbus, O.
Ford Roofing Products Co., Chicago.
Flintkote Co., New York City.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Johns-Manville, New York City.
Klee Co., Geo. B., Cincinnati.
Krehbiel Co., J. H., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Metropolitan Refining Co., Long Island City, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Pyrolite Products Co., Cleveland, O.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh.
Sauereisen Cements Co., Sharpsburg, Pa.
Smooth-on Mfg. Co., Jersey City, N. J.
Thompson & Co., Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.
Yardley Screen & Weather Strip Co., Columbus, O.

COMPOUNDS, GLAZING

Acme Refining Co., Cleveland, O.
●Armstrong Co., Detroit.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Diamond Metal Weather Strip Co., Columbus, O.
Goodrich Co., B. F., Akron, O.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Lastik Products Co., Inc., Pittsburgh, Pa.
Pecora Paint Co., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Pyrolite Products Co., Cleveland, O.
Thompson & Co., Pittsburgh, Pa.

COMPOUNDS, TINNING

Alpha Metal & Rolling Mills, Inc., Brooklyn.
American Solder & Flux Co., Philadelphia, Pa.
Burnley Battery & Mfg. Co., North East, Pa.
Consolidated Metals Corp., Detroit.
Eagle-Picher Lead Co., Cincinnati, O.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
Potomac Mfg. Co., Philadelphia, Pa.
●Ruby Chemical Co., Columbus, O.

COMPOUNDS, WATER-PROOFING

Acorn Refining Co., Cleveland, Ohio.
American Barlock Co., Inc., Long Island City, N. Y.
Asphalt Products Co., Syracuse, N. Y.
Barber Asphalt Corp., Barber, N. J.
Barrett Co., New York City.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Bird & Son, Inc., East Walpole, Mass.
Carey Co., Philip, Cincinnati, O.
Continental Products Co. Euclid, Ohio.
Ford Roofing Products Company, Chicago.
Flintkote Co., New York City.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., The, Cleveland.
Hetzel Roofing Products Co., Newark, N. J.
Johns-Manville, New York City.
Klee Co., Geo. B., Cincinnati.
Koppers Co., Pittsburgh.
Lastik Products Co., Inc., Pittsburgh, Pa.
Pecora Paint Co., Philadelphia, Pa.
Pyrolite Products Co., Cleveland.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh.
Sauereisen Cements Co., Sharpsburg, Pa.
Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.
Technical Coatings, Inc., Brooklyn, N. Y.
Thompson & Co., Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.

COMPRESSORS, REFRIGERATING

●Airtemp Division Chrysler Corp., Dayton, Ohio.
Baker Ice Machine Co., Inc., Omaha, Nebr.
Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Copeland Refrigeration Corp., Sidney, Ohio.
Corozone Air Conditioning Corp., The, Cleveland.
Curtis Refrigerating Machine Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago.
Frick Co., Waynesboro, Pa.
Frigidaire Commercial & Air Conditioning Division, General Motor Sales Corporation, Dayton, O.
●General Electric Co., Bloomfield, N. J.
General Machinery Co., Spokane, Wash. (Ammonia).
General Refrigeration Corporation, Beloit, Wis.
Hardy Mfg. Co., Dayton, O.
Howe Ice Machine Co., Chicago.
Ingersoll-Rand, New York City.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit.
Merchant & Evans Co., Philadelphia, Pa.
Mills Novelty Co., Chicago, Ill.
Modern Equipment Corp., Defiance, Ohio.
Nash Refrigeration Co., Inc., Newark, N. J.
●Norge Htg. & Conditioning Div., Borg-Warner Corp., Detroit.
Phoenix Ice Machine Co., Cleveland.
Reliance Refrigeration Machine Co., Chicago, Ill.
Servel, Inc., Evansville, Ind.
Starr Piano Co., Richmond, Ind.
Stewart Ice Machine Co., Los Angeles, Cal.
Tecumseh Products Co., Tecumseh, Mich.
Trane Co., LaCrosse, Wis.
Triumph Ice Machine Co., Cincinnati, O.
Uniflow Mfg. Co., Erie, Pa.
●Universal Cooler Corp. Detroit, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Williams Oil-O-Matic Heating Corp., Bloomington, Ill.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Ice Machinery Corp., York, Pa.

CONDUCTOR PIPE

See Pipe, Conductor

CONNECTIONS, DUCT, FLEXIBLE

(Asbestos, Canvas, etc.)

Canvas Products Co., St. Louis.
Carpenter & Co., Geo. B., Chicago.
Felters Co., Inc., The, Boston.
●Wilson, Inc., Grant, Chicago.

CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Bonnet Control of Blower)

●Barber-Colman Company, Rockford, Ill.
Barclay, Inc., Robert, Chicago.
●Cook Electric Co., Chicago.
●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
●Mercoid Corporation, Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
Russell Electric Company, Chicago, Ill.
Spencer Thermostat Company, Attleboro, Mass.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis.

CONTROL SYSTEMS, FORCED AIR FURNACE, HAND-FIRED (PACKAGE)

(Thermostat Control of Blower)

●Barber-Colman Company, Rockford, Ill.
●Cook-Electric Co., Chicago.
●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
●General Controls Co., Glendale, Cal.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Spencer Thermostat Company, Attleboro, Mass.

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●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis.

CONTROL SYSTEMS, GRAVITY FURNACE, HAND-FIRED (PACKAGE)

Automatic Products Co., Milwaukee.
●Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
●General Controls Co., Glendale, Cal.
●Mercoid Corporation, Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
Russell Electric Co., Chicago.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Company, Attleboro, Mass.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis.

CONTROL SYSTEMS, ZONE DISTRIBUTION, COMPLETE

Au-Temp-Co Corp., New York City.
●Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago.
●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
Sampsel Time Control, Inc., Mendota, Ill.
●White-Rodgers Electric Co., St. Louis.

CONTROLS, COMBINED FAN AND LIMIT, LINE VOLTAGE

●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
McCorkle Co., D. H., Berkeley, Cal.
●Mercoid Corporation, Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, Ohio.
United Electric Controls Co., South Boston, Mass.
●White-Rodgers Electric Co., St. Louis.

CONTROLS, COMBINED FAN AND LIMIT, LOW VOLTAGE

●Barber-Colman Company, Rockord, Ill.
●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis.

CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LINE VOLTAGE

●Cook Electric Co., Chicago.
●General Controls Co., Glendale, Cal.
Hays Corp., Michigan City, Ind.
●Mercoid Corporation, Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Russell Electric Co., Chicago.
United Electric Controls Co., South Boston, Mass.

CONTROLS, COMBUSTION, BONNET OR SMOKE-PIPE, LOW VOLTAGE

●Cook Electric Co., Chicago.
●Magnet Switch Co., Chicago.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Russell Electric Co., Chicago.
●White Manufacturing Co., St. Paul, Minn.

CONTROLS, EFFECTIVE TEMPERATURE

Allen-Bradley Company, Milwaukee.
●Barber-Colman Co., Rockford, Ill.
Friez & Sons, Julien P., Baltimore.
Johnson Service Co., Milwaukee, Wis.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.

CONTROLS, FAN, LINE VOLTAGE

Allen-Bradley Company, Milwaukee.
Clark Controller Co., Cleveland.
●Cook Electric Co., Chicago.
●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
●Gleason-Avery, Inc., Auburn, N. Y.
Hart Manufacturing Co., Hartford, Conn.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Ranco Inc., Columbus, O.
Russell Electric Co., Chicago.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Co., Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.
●White-Rodgers Electric Co., St. Louis.

CONTROLS, FAN, LOW VOLTAGE

●Barber-Colman Co., Rockford, Ill.
Clark Controller Co., Cleveland.
●Cook Electric Co., Chicago.
●Detroit Lubricator Co., Detroit.
Friez & Sons, Julien P., Baltimore.
●Gleason-Avery, Inc., Auburn, N. Y.
McCorkle Co., D. H., Berkeley, Cal.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Spencer Thermostat Co., Attleboro, Mass.
Russell Electric Co., Chicago.
United Electric Controls Co., South Boston, Mass.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis.

CONTROLS, HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS, PNEUMATIC

Atlas Valve Company, Newark, N. J.
Bristol Co., Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.

CONTROLS, LIMIT, LINE VOLTAGE

●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
●Gleason-Avery, Inc., Auburn, N. Y.
Hart Manufacturing Co., Hartford, Conn.
●Mercoid Corporation, Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Russell Electric Co., Chicago, Ill.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Company, Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.
●White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, LIMIT, LOW VOLTAGE

Automatic Products Co., Milwaukee, Wis.
●Barber-Colman Company, Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
●General Controls Co., Glendale, Cal.
●Gleason-Avery, Inc., Auburn, N. Y.
McCorkle Co., D. H., Berkeley, Cal.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.

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Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Company, Attleboro, Mass.
Russell Electric Co., Chicago, Ill.
United Electric Controls Co., South Boston, Mass.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, OIL BURNER, COMPLETE ASSEMBLY

Au-Temp-Co Corp., New York City.
●Detroit Lubricator Co., Detroit, Mich.
●General Controls Co., Glendale, Cal.
●General Electric Co., Bloomfield, N. J.
●Mercoid Corporation, Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
United Electric Controls Co., South Boston, Mass.

CONTROLS, STOKER, COMPLETE ASSEMBLY

Au-Temp-Co Corp., New York City.
●Detroit Lubricator Co., Detroit, Mich.
●General Electric Co., Bloomfield, N. J.
●Gleason-Avery, Inc., Auburn, N. Y.
Friez & Sons, Julien P., Baltimore.
●Mercoid Corporation, Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Palmer Electric Co., Chicago.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Sampsel Time Control Inc., Mendota, Ill.
Spencer Theromstat Co., Attleboro, Mass.
●White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, WINDOW CONDENSATION

●Barber-Colman Company, Rockford, Ill.
Friez & Sons, Julien P., Baltimore, Md.

COOLING SURFACE

See Coils, Cooling, Water

COPPERS, SOLDERING

●American Brass Company, Waterbury, Conn.
Bernz Co., Inc., Otto, Rochester, N. Y.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Electric Materials Co., North East, Pa.
Electric Soldering Iron Co., Inc., Deep River, Conn.
Everhot Mfg. Co., Maywood, Ill.
Gasweld Equipment Co., Chicago, Ill. (Acetylene)
General Electric Co., Schenectady, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Ideal Commutator Dresser Co., Sycamore, Ill.
Linde Air Products Co., The, New York City.
Minn-Kota Foundry & Mfg. Co., Fargo, N. Dak.
●Parker-Kalon Corp., New York City.
Peck, Stow & Wilcox Co., Southington, Conn.
Revere Copper and Brass, Incorporated, New York City.
Sight Feed Generator Co., Richmond, Ind.
Stanley Tools, New Britain, Conn.
Turner Brass Works, Sycamore, Ill.
Vulcan Electric Co., Lynn, Mass.
Weiss & Co., H., New York City.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Flexible Coupling Co., Erie, Pa.
Bartlett Hayward Co., Baltimore, Md.
Blood Brothers, Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Caldwell Co., W. E., Louisville, Ky.
Certified Flexible Couplings, Inc., New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Co., Chicago, Ill.
●Congress Tool & Die Co., Detroit, Mich.
Continental Diamond Fibre Co., Newark, Del.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain & Mfg. Co., Indianapolis, Ind.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Co., Mishawaka, Ind.
Flexo Supply Co., Inc., St. Louis, Mo.
●Frederick Iron & Steel Co., Frederick, Md.
General Electric Co., Schenectady, N. Y.
Guardian Utilities Co., Michigan City, Ind.
Jones Foundry Machine Co., W. A., Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Link-Belt Co., Chicago, Ill.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Monarch Mfg. Wks., Inc., Philadelphia.
Moran Flexible Steam Joint Co., Louisville, Ky.
Morse Chain Co., Ithaca, N. Y.
Poole Foundry & Machine Co., Baltimore, Md.
Shallcross Co., Philadelphia, Pa.
Smith, Inc., Winfield H., Springville, N. Y.
Strong-Scott Mfg. Co., Minneapolis, Minn.
Waldron Corp., John, New Brunswick, N. J.
Whitney Chain & Mfg. Co., The, Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.

DAMPER MOTORS

See Motors, Damper, Furnace Draft, Electrical

DAMPER CONTROLS

See Regulators, Damper Sets

DAMPER REGULATOR SETS

See Regulators, Damper Sets

DAMPERS, SMOKE PIPE

Adams Company, The, Dubuque, Ia.
●Brauer Supply Co., A. G., St. Louis, Mo.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Calesco Corporation, Lynn, Mass.
●Char-Gale Mfg. Co., Minneapolis.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Griswold Mfg. Co., Erie. Pa.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hotstream Heater Co., Cleveland.
Jewett Stove & Foundry Corp., Buffalo, N. Y.
Keith Furnace Co., Des Moines, Ia.
Liberty Foundry Co., St. Louis, Mo.
Littleford Bros., Cincinnati, O.
●Magnet Switch Co., Chicago.
Maple City Furnace Co., Monmouth, Ill.
Martin Metal Mfg. Co., Wichita, Kan.
Metzner Stove Repair Co., Kansas City, Mo.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Preferred Utilities Manufacturing Corp., New York City.
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
Schoedinger, F. O., Co., Columbus, O.
Stove Mfg. & Engine Co., Freeport, Ill.
●United States Register Co., Battle Creek, Mich.
Walker Mfg. & Sales Corp., St. Joseph, Mo.
●Williamson Heater Co., Cincinnati, O.

DIFFUSERS, AIR, HIGH VELOCITY

Anemostat Corporation of America, New York City.
●Barber-Colman Company, Rockford, Ill.
●Tuttle & Bailey, Inc., New Britain, Conn.

DOORS, HOLLOW METAL

American Sheet Metal Works, New Orleans, La.
Bayer Co., A. J., Los Angeles, Cal.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Decatur Iron & Steel Co., Decatur, Ala.
Detroit Steel Products Co., Detroit.
Edwards Mfg. Co., Inc., Cincinnati, O.
International Steel Co., Evansville, Ind.
Maysteel Products, Inc., Mayville, Wis.
Metal Door & Trim Co., La Porte, Ind.
Newman Brothers, Inc., Cincinnati, O.
Perkinson & Brown, Chicago, Ill.
Richmond Fireproof Door Co., Richmond, Ind.
Truscon Steel Co., Youngstown, O.

DOORS, KALAMEIN

American Sheet Metal Works, New Orleans, La.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Cincinnati Mfg. Co., Cincinnati, O.
Dusing & Hunt, Inc., Buffalo.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Door Co., Inc., New York City.
Herrmann & Grace Co., Brooklyn, N. Y.
International Steel Co., Evansville, Ind.
Lee & Son Co., Thomas, Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
Mesker & Co., Geo. L., Evansville, Ind.
Newman Brothers, Inc., Cincinnati, O.
Perkinson & Brown, Chicago, Ill.
Richmond Fireproof Door Co., Richmond, Ind.
Syracuse Fire Door Corp., Syracuse, N. Y.
Van Noorden Co., E., Boston, Mass.

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DOORS AND SHUTTERS, FIRE

American Sheet Metal Works, New Orleans, La.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Cornell Iron Works, Inc., Long Island City, N. Y.
Detroit Steel Products Co., Detroit.
Dusing & Hunt, Inc., Buffalo.
Edwards Mfg. Co., Inc., Cincinnati, O.
Empire Door Co., Inc., New York City.
Falstrom Co., Passaic, N. J.
Herrmann & Grace Co., Brooklyn, N. Y.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
International Steel Co., Evansville, Ind.
Kinnear Mfg. Co., Columbus, O.
Mahon Co., R. C., Detroit, Mich.
Maysteel Products, Inc., Mayville, Wis.
Merchant & Evans Co., Philadelphia, Pa.
Mesker & Co., Geo. L., Evansville, Ind.
Perkinson & Brown, Chicago, Ill.
Richards-Wilcox Mfg. Co., Aurora, Ill.
Richmond Fireproof Door Co., Richmond, Ind.
Saino Mfg. Co., Inc., F. L., Memphis, Tenn.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Syracuse Fire Door Corp., Syracuse, N. Y.
Van Noorden Co., E., Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.

DRAFT GAGES

See Gages, Draft

DRAFT REGULATORS

See Regulators, Furnace Draft, Mechanical

DRILLS, ELECTRIC, PORTABLE

Black & Decker Mfg. Co., Towson, Md.
Chicago Pneumatic Tool Co., New York City.
Cincinnati Electrical Tool Co., Cincinnati, O.
Clark, Jr., Electric Co., Jas., Louisville, Ky.
Independent Pneumatic Tool Co., Chicago, Ill.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Misener Mfg. Co., Inc., Syracuse, N. Y.
Power King Tool Corp., Warsaw, Ind.
Signal Electric Mfg. Co., Menominee, Mich.
Skilsaw, Inc., Chicago.
Snap-On Tools Corp., Kenosha, Wis.
Speedway Mfg. Co., Cicero, Ill.
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
United States Electrical Tool Co., Cincinnati, O.
Van Dorn Electric Tool Co., Towson, Md.
●Wodack Electric Tool Corp., Chicago, Ill.

DUCTS AND DUCT FITTINGS, PREFABRICATED

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate and Roofing Supply Co., Philadelphia, Pa.
Carey Co., Philip, Cincinnati, O.
Champion Furnace Pipe Co., Peoria, Ill.
●Chandler Co., Cedar Rapids, Ia.
●Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Henry Furnace & Foundry Co., Cleveland, O.
Herbert & Sons, T. L., Nashville, Tenn.
Howes Co., S. M., Charlestown, Boston.
Lamneck Products, Inc., Columbus, O.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Moncrief Furnace Co., Atlanta, Ga.
●Mueller Furnace Co., L. J., Milwaukee.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Season-Aire Corporation of America, Detroit.
●United States Register Co., Battle Creek, Mich.
●Williamson Heater Co., Cincinnati, O.

EAVES TROUGH FITTINGS AND ACCESSORIES

See Fittings and Accessories, Eaves Trough and Gutter

EAVES TROUGH AND GUTTERS

American Sheet Metal Works, New Orleans, La.
Ames Co., W. R., San Francisco, Cal.
Anderson Mfg. Co., Des Moines, Ia.
Barnes Metal Products Co., Chicago, Ill.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
●Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Bridesburg Foundry Co., Philadelphia, Pa.
California Cornice, Steel & Supply Corp., Los Angeles.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Hussey & Co., C. G., Pittsburgh, Pa.
International Steel Co., Evansville, Ind.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Long Island City, N. Y.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis. (Square Hanging)
Miller & Doing, Inc., Brooklyn, N. Y.
Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Reeves Steel & Mfg. Co., Dover, O.
●Republic Steel Corporation, Cleveland.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Art Metal Co., Tiffin, O.
Van Noorden Co., E., Boston, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Williams- Wallace Co., San Francisco.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.
York Corrugating Co., York, Pa.

ELBOWS, BLOW PIPE

See Fittings, Blow Pipe

ELBOWS, CONDUCTOR

See Fittings and Accessories, Conductor

ELBOWS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

ELECTRIC WELDERS

See Welders, Arc, Spot

ELECTRODES, ARC WELDING

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Aluminum Company of America, Pittsburgh.
●American Brass Co., Waterbury, Conn.
Arcos Corp., Philadelphia, Pa.
Bastian Blessing Co., Chicago.
General Electric Co., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee.
Hobart Brothers Company, Troy, Ohio.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., Pittsburgh.
Metal & Thermit Corp., New York City.
Page Steel & Wire Div., of American Chain & Cable Co., Inc., Monessen, Pa.
Revere Copper and Brass Incorporated, New York City.
Roebling's Sons Co., John A., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, O.
Torchweld Equipment Co., Chicago, Ill.
Una Welding, Inc., Cleveland.
Universal Power Corp., Cleveland, O.
Westinghouse Electric & Mfg. Co., East Pittsburgh.
Wilson Welder & Metals Co., Inc., New York City.

ENAMELS & LACQUERS

Baer Brothers, New York City.
Barrett Co., New York City.
Debevoise Co., Brooklyn, N. Y.
duPont de Nemours & Co., E. I., Wilmington, Del.
Ford Roofing Products Co., Chicago.
Glidden Co., The, Cleveland.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Inter-Coastal Paint Co., East St. Louis, Ill.
Krehbiel Co., J. H., Chicago.
Maas & Waldstein Co., Newark, N. J.
O'Brien Varnish Co., South Bend, Ind.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Wailes Dove-Hermiston Corp., New York City.
Wilhelm Co., A., Reading, Pa.
Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.

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FACES, COLD AIR, WOOD

American Wood Register Co., Plymouth, Ind.
Antigo Bldg. Supply Co., Antigo, Wis.
Garber Lumber & Construction Co., Strasburgh, O.
Marsh Lumber Co., Inc., Dover, O.
McClure Builders' Supply Co., E. Palestine, O.
Wooster Art Wood, Inc., Wooster, O.

FAN—FILTER UNITS, PROPELLER

(Separate conversion unit for warm air furnaces)

●Air Controls, Inc., Cleveland, O.
●Henry Furnace & Foundry Co., Cleveland, O.
Peerless Electric Co., Warren, O.

FANS, BOOSTER, COLD AIR RETURN

●A-C Mfg. Co., Pontiac, Ill.
Advance Aluminum Castings Corp., Chicago, Ill.
Aire-Foile Fan & Blower Company, Detroit, Mich.
Autovent Fan Co., Piqua, O.
Brumme Mfg. Co., Chicago, Ill.
Brundage Co., Kalamazoo, Mich.
Cary Mfg. Co., Waupaca, Wis.
Economy Electric Mfg. Co., Cicero, Ill.
Forct-Air Co., Rockford, Ill.
General Blower Co., Philadelphia.
General Regulator Corp., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Peerless Electric Co., Warren, O.
Propellair, Inc., Springfield, O.
Roan Mfg. Co., Racine, Wis.
●Torrington Mfg. Co., Torrington, Conn.
Universal Blower Co., Birmingham, Mich.

FANS, BOOSTER, ONE-PIPE WARM AIR

Advance Aluminum Castings Corp., Chicago.
Aire-Foile Fan & Blower Co., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
Brumme Mfg. Co., Chicago, Ill.
Brundage Co., Kalamazoo, Mich.
Economy Electric Mfg. Co., Cicero, Ill.
Forct-Air Co., Rockford, Ill.
Kisco Company, Inc., St. Louis.
Meier Electric & Machine Co., Indianapolis, Ind.
Midwestern Supply Co., Chicago.
●Mueller Furnace Co., L. J., Milwaukee.
●Torrington Mfg. Co., Torrington, Conn.
Universal Blower Co., Birmingham, Mich.
●Victor Electric Products, Inc., Cincinnati, O.

FANS, FURNACE, PROPELLER TYPE

(Complete with mounting for installation in cold air return)

●Air Controls, Inc., Cleveland, O.
Autovent Fan & Blower Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Economy Electric Manufacturing Co., Cicero, Ill.
Forct-Air Co., Rockford, Ill.
General Regulator Corp., Chicago, Ill.
Haynes Furnace Fan Co., Kansas City, Mo.
●Henry Furnace & Foundry Co., Cleveland, O.
International Engineering, Inc., Dayton, O.
Meier Electric & Machine Co., Indianapolis, Ind.
Peerless Electric Co., Warren, O.
Philadelphia Machinery Co., Philadelphia.
Propellair, Inc., Springfield, O.
●Torrington Mfg. Co., Torrington, Conn.

FANS, KITCHEN EXHAUST

Aerovent Fan Co., Piqua, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Airtherm Mfg. Co., St. Louis.
●Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.
Belanger Fan & Blower Co., Detroit.
Berns Specialty Co., Chicago, Ill.
Birmingham Fan Mfg. Co., Birmingham, Ala.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Dallas Engineering Co., Inc., Dallas, Tex.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Co., Elizabethport, N. J.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Corp., Detroit, Mich.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Forct-Air Co., Rockford, Ill.
Garden City Fan Co., Chicago, Ill.
Gas City Glass Co., Gas City, Ind.
General Blower Co., Philadelphia, Pa.
●General Electric Co., Bloomfield, N. J.
General Regulator Corp., Chicago, Ill.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jaden Manufacturing Co., F., Hastings, Nebr.
King Ventilating Co., Owatonna, Minn.
Kisco Company, Inc., St. Louis, Mo.
Marathon Electric Mfg. Corp., Wausau, Wis.
Myers Electric Co., Pittsburgh, Pa.
National Standard Air Products Co., Chicago.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Philadelphia Machinery Co., Philadelphia.
Propellair, Inc., Springfield, O.
Pryne & Co., Inc., Los Angeles, Cal.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Company, Chicago.
Robbins & Myers, Inc., Springfield, O.
Shreveport Engineering Co., Inc., Shreveport, La.
Signal Electric Mfg. Co., Menominee, Mich.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
●Torrington Mfg. Co., Torrington, Conn.
Universal Blower Co., Birmingham, Mich.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utility Fan Corporation, Los Angeles, Cal.
●Victor Electric Products, Inc., Cincinnati, O.
Wagner Electric Corp., St. Louis, Mo.
Ward Mfg. Co., Detroit, Mich.
Western Blower Co., Seattle, Wash.

FANS, NIGHT AIR COOLING, COMPLETE UNIT

●Air Controls, Inc., Cleveland, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Alco Manufacturing Co., Houston, Tex.
●Allen Corporation, Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.
Belanger Fan & Blower Co., Detroit, Mich.
Belco Exhaust Fan Mfg. Co., St. Louis.
Birmingham Fan Mfg. Co., Birmingham, Ala.
Bryant Heater Co., Cleveland.
Buffalo Forge Co., Buffalo, N. Y.
Chelsea Fan & Blower Co., Inc., New York City.
Circulators & Devices Mfg. Corp., New York City.
DeBothezat Ventilating Eq. Div., American Machine & Metals, Inc., East Moline, Illinois.
Diehl Mfg. Co., Elizabethport, N. J.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Forker Corporation, Cleveland.
Fresh'nd-Aire Co., Chicago.
General Blower Co., Philadelphia, Pa.
●General Electric Co., Bloomfield, N. J.
General Regulator Corp. Chicago, Ill.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
King Ventilating Co., Owatonna, Minn.
Kisco Company, Inc., St. Louis, Mo.
●Lau Blower Co., Dayton, O.
Lohman, Inc., William J., New York City.
Marathon Electric Mfg. Corp., Wausau, Wis.
Meier Electric & Machine Co., Indianapolis, Ind.
National Standard Air Products Co., Chicago.
New York Blower Co., Chicago, Ill.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Philadelphia Machinery Co., Philadelphia.
Preferred Utilities Mfg. Corp., New York City.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., Chicago.
Robbins & Myers, Inc., Springfield, O.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Shreveport Engineering Co., Inc., Shreveport, La.
Silent Sioux Oil Burner Corp., Orange City, Iowa.
South Bend Air Products, Inc., South Bend, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Todd Air Conditioning Co., Inc., Bonner Springs, Kan.
Universal Blower Co., Birmingham, Mich.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utility Fan Corporation, Los Angeles, Cal.
U. S. Machine Corporation, Lebanon, Ind.
●Victor Electric Products, Inc., Cincinnati, O.
●Viking Air Conditioning Corp., Cleveland, O.
Wagner Electric Corp., St. Louis.
Western Blower Co., Seattle, Wash.
●Wood Industries, Inc., Gar, Detroit, Mich.

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FANS, VENTILATING, PROPELLER TYPE

(Capacity 4,000 c.f.m. up)

Aerovent Fan Co., Piqua, O.
●Air Controls Inc., Cleveland, O.
Aircraft Mfg. Co., Dayton, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Alco Manufacturing Co., Houston, Tex.
●Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
Ames Co., W. R., San Francisco, Cal.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Barrett Engineers, Cleveland Heights, O.
Bayley Blower Co., Milwaukee, Wis.
Belanger Fan & Blower Co., Detroit, Mich.
Belco Exhaust Fan Mfg. Co., St. Louis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Circulators & Devices Mfg. Corp., New York City.
●Clarage Fan Co., Kalamazoo, Mich.
Dallas Eng. Co., Inc., Dallas, Tex.
De Bothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Diehl Mfg. Co., Elizabethport, N. J.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., St. Louis, Mo.
Forct-Air Co., Rockford, Ill.
Fresh-nd-Aire Co., Chicago, Ill.
Garden City Fan Co., Chicago, Ill.
Gas City Glass Co., Gas City, Ind.
General Blower Co., Philadelphia, Pa.
●General Electric Co., Bloomfield, N. J.
General Regulator Corp., Chicago, Ill.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
Hall Mfg. Co., Cedar Rapids, Ia.
Hartzell Propeller Fan Co., Piqua, O.
Herbert & Sons, T. L., Nashville, Tenn.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hudson Equipment Corp., Minneapolis, Minn.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jeffrey Mfg. Co., The, Columbus, O.
Johnson Fan & Blower Corp., Chicago, Ill.
Johnston & Co., Wm. W., Dayton, O.
Jordan & Co., Paul R., Indianapolis, Ind.
King Ventilating Co., Owatonna, Minn.
Kisco Company, Inc., St. Louis, Mo.
Marathon Electric Mfg. Corp., Wausau, Wis.
Meier Electric & Machine Co., Indianapolis, Ind.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Pittsburgh, Pa.
National Standard Air Products Co., Chicago.
New York Blower Co., Chicago, Ill.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
Philadelphia Machinery Co., Philadelphia.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Company, Chicago.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Shreveport Engineering Co., Inc., Shreveport, La.
South Bend Air Products, Inc., South Bend, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
●Torrington Mfg. Co., Torrington, Conn.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
U. S. Machine Corporation, Lebanon, Ind.
Utility Fan Corporation, Los Angeles, Cal.
●Victor Electric Products, Inc., Cincinnati, O.
●Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Los Angeles, Cal.
Wing Mfg. Co., L. J., New York City.

FASTENINGS, SPRING STEEL

●Tinnerman Products, Inc., Cleveland.

FILTERS, AIR, AUTOMATIC

Air Steam Filter Corp., St. Louis.
●American Air Filter Co., Inc., Louisville, Ky.
Coppus Engineering Corp., Worcester, Mass.
Dracco Corp., Cleveland, O.
Staynew Filter Corp., Rochester, N. Y.
Westinghouse Electric & Mfg. Co., Cleveland. (Electrostatic Precipitator)

FILTERS, AIR, UNIT, CLEANABLE

●Air Maze Corp., Cleveland, O.
●American Air Filter Co., Inc., Louisville, Ky.
●American Foundry & Furnace Co., Bloomington, Ill.
Amirton Co., Inc., New York City.
Annis Air Filters, Glendale, Cal.
●Blocksom & Company, Michigan City, Ind.
●Char-Gale Mfg. Co., Minneapolis.
Chicago Air Filter Co., Joliet, Ill.
Coppus Engineering Corp., Worcester, Mass.
Davies Air Filter Corp., New York, N. Y.
Hugo Mfg. Co., West Duluth, Minn.
Kleenaire Corp., Stevens Point, Wis.
Kraissl Co., Inc., Hackensack, N. J.
Somers, Inc., H. J., Detroit, Mich.
Staynew Filter Corp. Rochester, N. Y.
Supreme Air Filter Co., New York City.
Tuttle Air Filter Co., Inc., Louisville, Ky.
Universal Air Filter Corp., Duluth, Minn.

FILTERS, AIR, UNIT, THROWAWAY

●American Air Filter Co., Inc., Louisville, Ky.
Amirton Co., Inc., New York City.
Anderson Products, Inc., Cambridge, Mass.
●Blocksom & Company, Michigan City, Ind.
Chicago Air Filter Co., Joliet, Ill.
Davies Air Filter Corp., New York City.
●Detroit Lubricator Co., Detroit.
●Furblo Company, Hermannsville, Mich.
Gehri Company, Tacoma, Wash. (Viscous)
Hugo Manufacturing Company, Duluth, Minn.
Kleenaire Corp., Stevens Point, Wis.
●Mueller Furnace Co., L. J., Milwaukee.
●Owens-Corning Fiberglas Corp., Toledo, O.
Plymouth Cordage Co., N. Plymouth, Mass. (Anderson Products, Inc., Cambridge, Mass., National Sales Agents)
Research Products Corp., Madison, Wis.
Staynew Filter Corp., Rochester, N. Y.
Tuttle Air Filter Co., Inc., Louisville, Ky.
Universal Air Filter Corp., Duluth, Minn.
●Wilson & Co., Chicago, Ill.

FIRE BRICK

See Refractories

FITTINGS AND ACCESSORIES, CONDUCTOR

(Elbows, Heads, Hooks, Shoes, Straps, etc.)

Ames Co., W. R., San Francisco.
Barnes Metal Products Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.
Berger Mfg., Div. of Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Crary Mfg. Co., Middleport, O. (Cut-off.)
Dieckmann Co., Ferdinand, Cincinnati, O.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
●Hussey & Co., C. G., Pittsburgh, Pa.
Iwan Bros., South Bend, Ind.
Jeliff Mfg. Corp., C. O., Southport, Conn.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
●Levow, David, New York City.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
Maysteel Products, Inc., Mayville, Wis.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Rival Strap Corp., New York City. (Ornamental Conductor Straps)
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Stewart Foundry, O. S., Cleveland, O. (Iron Conductor Shoes)
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Williams-Wallace Co., San Francisco.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.

FITTINGS AND ACCESSORIES, EAVES TROUGH AND GUTTER

(Hangers, Strainers, Miters, Ends, Thimbles, etc.)

Abbott Mfg. Co., Painesville, O. (Hangers)
Ames Co., W. R., San Francisco.
Barnes Metal Products Co., Chicago, Ill.
●Berger Bros. Co., Philadelphia, Pa.

Berger Mfg., Div. of Republic Steel Corp., Canton, O.
Bertram Mfg. Co., Chicago, Ill.
Boyd & Co., Inc., Charles P., Philadelphia.
Braden Mfg. Co., Terre Haute, Ind.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Grand Rapids Wire Products Co., Grand Rapids, Mich.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Iwan Brothers, South Bend, Ind.
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Ledkote Products Co., Long Island City, N. Y.
●Levow, David, New York City.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Ohio Wire Products Co., Dover, O. (Hangers)
●Osborn Co., J. M. & L. A., Cleveland, O.
Reeves Steel & Mfg. Co., Dover, O.
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
St. Paul Corrugating Co., St. Paul, Minn.
Sheet Metal Products Co., Peoria, Ill.
Snap-On Mfg. Co., Chicago, Ill. (Hangers)
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Art Metal Co., Tiffin, O.
U. S. Cistern Filter Mfg. Co., Bloomington, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Williams-Wallace Co., San Francisco.
Willis Mfg. Co., Galesburg, Ill.
Woolwine Metal Products Co., Los Angeles, Cal.

FITTINGS AND ACCESSORIES, FURNACE PIPE

(Angles, Boots, Elbows, Heads, Joints, Offsets, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bergstrom Mfg. Corp., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stampings Co., Canonsburg, Pa.
Campbell Heating Co., Des Moines, Ia.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
●Char-Gale Mfg. Co., Minneapolis.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia, Pa.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Farquhar Furnace Co., Wilmington, O.
Green Fdry. & Furnace Wks., Des Moines, Iowa.
●Henry Furnace & Foundry Co., Cleveland, O.
Howe & Bassett Co., Inc., Rochester, N. Y. (Boots)
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis. (Elbows and pipe only.)
●Lamneck Products, Inc., Columbus, O.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
●Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Monarch Furnace Fittings Manufacturers, Chicago, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
●Osborn Co., J. M. & L. A., Cleveland, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Company, Dowagiac, Mich.
Ramey Mfg. Co., Columbus, O.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
Schecter Brothers Co., Philadelphia, Pa.
Standard Furnace & Supply Co., Omaha, Nebr.
Sterling Foundry Co., Sterling, Ill. (Cast Iron)
Stratton & Terstegge Co., Louisville, Ky.
Tiffin Art Metal Co., Tiffin, O.
●Tuttle & Bailey, Inc., New Britain, Conn. (Turning blades)
●United States Register Co., Battle Creek, Mich.
●Waterman-Waterbury Co., Minneapolis.
Waverly Heating Supply Co., Boston.
Wheeling Corrugating Co., Wheeling, W. Va.
●Williamson Heater Co., Cincinnati, O.

FITTINGS AND ACCESSORIES, SMOKE PIPE

(Draw-bands, Clean-outs, Collars, Tees, etc.)

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Bergstrom Mfg. Corp., Neenah, Wis.
Braden Mfg. Co., Terre Haute, Ind.
●Brauer Supply Co., A. G., St. Louis, Mo.
Cary Mfg. Co., Waupaca, Wis.
Champion Furnace Pipe Co., Peoria, Ill.
●Char-Gale Mfg. Co., Minneapolis.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
●Excelsior Steel Furnace Co., Chicago, Ill.
Green Fdry. & Furnace Wks., Des Moines, Iowa.
Harold Furnace Mfg. Co., Spokane, Wash.
●Henry Furnace & Foundry Co., Cleveland, O.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
●Lamneck Products, Inc., Columbus, O.
Lyman Co., H. B., Southampton, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
●Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
Martin Metal Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
●Osborn Co., J. M. & L. A., Cleveland, O.
Patten Co, J. V., Sycamore, Ill.
Peacard Co., M. A., Boston.
●Peerless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Company, Dowagiac, Mich.
Ramey Mfg. Co., Columbus, Ohio.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
Schecter Brothers Co., Philadelphia, Pa.
Schoedinger, F. O., Columbus, O.
Standard Furnace & Supply Co., Omaha, Nebr.
Stratton & Terstegge Co., Louisville, Ky.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
●Waterman-Waterbury Co., Minneapolis.
Waverly Heating Supply Co., Boston.
Wilder Manufacturing Co., Niles, O.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.

FITTINGS, BLOW PIPE

(Elbows, Flanges, Hangers, Hoods and Sweeps, Joints, Rings, Tubing)

Acer & Whedon, Inc., Medina, N. Y.
Airtherm Mfg. Co., St. Louis, Mo.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Day Co., Minneapolis, Minn.
Falstrom Co., Passaic, N. J.
Goethel Co., Alfred C., Milwaukee, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Kirk & Blum Mfg. Co., Cincinnati, O.
Lee & Son Co., Thomas, Cincinnati, O.
Mahon Co., R. C., Detroit, Mich.
●Meyer & Bro. Co., F., Peoria, Ill.
Puhl & Hepper Mfg. Co., Inc., St. Louis.
Tiffin Art Metal Co., Tiffin, Ohio.
●United States Register Co., Battle Creek, Mich.
Western Blower Co., Seattle, Wash.
Young & Bertke Co., Cincinnati, O.

FITTINGS, HUMIDIFIER, WATER LINE

●American Brass Co., Waterbury, Conn.
Bishop Humidifier Co., Detroit, Mich.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Hays Mfg. Co., Erie, Pa.
●Maid-O'-Mist, Inc., Chicago, Ill.
●Monmouth Products Co., Cleveland, O.
Reichert Float & Mfg. Co., Toledo, O.

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Rockford Brass Works, Rockford, Ill.
Sallada Mfg. Co., Minneapolis, Minn.
●Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
●Skuttle Co., J. L., Detroit, Mich.
Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.
Weatherhead Co., Cleveland, O.

FLANGES, BLOW PIPE

See Fittings, Blow Pipe

FLASHINGS, ROOF, PATENTED

Alpha Metal & Rolling Mills, Inc., Brooklyn.
●American Rolling Mill Co., Middletown, Ohio.
Barber Asphalt Corporation, Barber, N. J.
Barrett Co., New York City (for brick and concrete)
Berger Mfg. Div. Republic Steel Co., Canton, Ohio.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Cheney Co., Philadelphia.
Chicago Metal Mfg. Co., Chicago, Ill.
Cox Roofing Co., Winston-Salem, N. C.
Downs-Smith Brass & Copper Co., New York City.
Eagle-Picher Lead Co., Cincinnati, O.
Edwards Mfg. Co., Inc., Cincinnati, O.
Figge Mfg. Co., Chicago, Ill.
Flamm Lead Company, Inc., Long Island City, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Revere Copper and Brass Incorporated, New York City.
Robertson Co., H. H., Pittsburgh, Pa.
Rochester Lead Works, Inc., Rochester, N. Y.
Schoedinger, F. O., Columbus, O.
Seep-Lok Flashing Co., Inc., Yonkers, N. Y.
Simplex Manufacturing Co., Fond du Lac, Wis.
ThruBond Flashing Corp., New York City.
Van Noorden Co., E., Boston, Mass.
Williams-Wallace Co., San Francisco.
Willis Mfg. Co., Galesburg, Ill. (Copper)
York Corrugating Co., York, Pa.

FLASHINGS, THROUGH-WALL, PATENTED

Alpha Metal & Rolling Mills, Inc., Brooklyn.
●American Brass Co., Waterbury, Conn. (Copper)
Barber Asphalt Corporation, Barber, N. J.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Cheney Co., Philadelphia, Pa. (Copper)
Figge Mfg. Co., Chicago.
Majestic Flashing Company, Baltimore.
Revere Copper and Brass Incorporated, New York City.
Robertson Co., H. H., Pittsburgh, Pa.
ThruBond Flashing Corp., New York City.
Van Noorden Co., E., Boston.
Willis Mfg. Co., Galesburg, Ill. (Galvanized & copper)

FLASHINGS, WALL, PATENTED

Alpha Metal & Rolling Mills, Inc., Brooklyn.
Barber Asphalt Corporation, Barber, N. J.
Berger Mfg. Co., Div. of Republic Steel Corp., Canton, O.
Cheney Co., Philadelphia, Pa.
Figge Mfg. Co., Chicago.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Majestic Flashing Company, Baltimore.
●Milcor Steel Co., Milwaukee, Wis.
Revere Copper and Brass Incorporated, New York City.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Van Noorden Co., E., Boston.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

FLUE GAS ANALYZERS

See Analyzers, CO_2, Portable

FLUX, SOLDERING

Air Reduction Sales Company, New York City. (Aluminum)
Allen Co., L. B., Chicago (Aluminum, Copper, Galv. Iron, Stainless Steel)
American Chemical Paint Co., Ambler, Pa.
American Solder & Flux Co., Philadelphia, Pa.
Bastian Blessing Co., Chicago.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y. (Salts, Pastes)
Burnley Battery & Mfg. Co., North East, Pa. (Paste, Salts, Solution)
Consolidated Metals Corp., Detroit.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Gardiner Metal Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Handy & Harmon, New York City.
Hercules Chemical Co., Inc., New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Co., Lloyd S., Chicago. (Aluminum, stainless steel, copper, galvanized iron)
●Johnson Gas Appliance Co., Cedar Rapids, Iowa.
Kester Solder Co., Chicago, Ill.
Langsenkamp Co., F. H., Indianapolis, Ind. (Stainless Steel)
Lukens Metal Co., Thos. F., Philadelphia, Pa. (Copper, Galvanized Iron, Stainless Steel)
Maplewood Machinery Co., Inc., Chicago.
McNamee Products, Glencoe, Ill.
Milburn Co., Alexander, Baltimore, Md.
Pfanstiehl Chemical Co., Waukegan, Ill.
Potomac Mfg. Co., Philadelphia, Pa.
●Ruby Chemical Co., Columbus, O. (Liquid and Paste)
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.

FURNACE BLOWERS

See Blowers, Furnace, Centrifugal

FURNACE-BURNER UNITS

See Furnaces, Warm Air

FURNACE COVERING

See Insulation, Furnace and Pipe

FURNACE LINING

See Refractories

FURNACE PIPE

See Pipe, Furnace

FURNACE PIPE FITTINGS AND ACCESSORIES

See Fittings and Accessories, Furnace Pipe

FURNACE REGULATORS

See Regulators, Furnace Draft, Mechanical and Motors, Damper, Furnace Draft, Electrical

FURNACE REPAIRS

See Repairs, Stove and Furnace

FURNACES, SOLDERING

Aeroil Burner Co., Inc., West New York, N. J.
Bernz Co., Inc., Otto, Rochester, N. Y.
Burgess Soldering Furnace Co., Columbus, O. (Gasoline)
Clayton & Lambert Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Electric Soldering Iron Co., Inc., Deep River, Conn.
Hauck Mfg. Co., Brooklyn, N. Y.
Hones, Inc., Charles A., Baldwin, N. Y.
Insto-Gas Corporation, Detroit.
●Johnson Gas Appliance Co., Cedar Rapids, Ia.
Liquefied Gas Appliance Co., Mars, Pa.
Reliable Gas Products Co., Cedar Rapids, Ia.
Turner Brass Works, Sycamore, Ill.
Vulcan Electric Co., Lynn, Mass.
Weiss & Co., H., New York City.

FURNACES, WARM AIR, AIR CONDITIONING, COAL, CAST IRON

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

Agricola Furnace Co., Inc., Gadsden, Ala.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
Andes Range & Furnace Corp. Geneva, N. Y.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Cleveland.
Des Moines Stove Repair Co., Des Moines, Ia.
●Excelsior Steel Furnace Co. Chicago, Ill.
●Faultless Heater Corp., Cleveland, O.
●Forest City Foundries Co., Cleveland, O.
Green Foundry & Furnace Wks., Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Fdy. Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
Home Furnace Co., Holland, Mich.
Ideal Furnace Co., Detroit, Mich.
Independence Stove & Furnace Co., Independence, Mo.
International Heater Co., Utica, N. Y.
Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
Liberty Foundry Co., St. Louis, Mo.

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MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
●Majestic Co., Huntington, Ind.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Olsen Mfg. Co., C. A., Elyria, O.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Co., Dowagiac, Mich.
Richardson & Boynton Co., New York City.
Robinson Furnace Co., Chicago, Ill.
Rock Island Stove Co., Rock Island, Ill.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Schill Mfg. Co., Crestline, O.
Sioux City Foundry & Boiler Company, Sioux City, Ia.
Spencer Heater Division, Williamsport, Pa.
Twentieth Century Heating & Ventilating Co., Akron, O.
Western Furnaces, Inc., Tacoma, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, AIR CONDITIONING, COAL, STEEL

(Complete matched, hand-fired, furnace, fan, filter and humidifier unit)

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee, Wis.
●Armstrong Furnace Co., Columbus, O.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Products Corp., Cleveland.
Dail Steel Products Co., Lansing, Mich.
Deshler Foundry & Machine Works, Deshler, O.
Des Moines Stove Repair Co., Des Moines, Ia.
●Excelsior Steel Furnace Co. Chicago, Ill.
●Farquhar Furnace Co., Wilmington, O.
●Faultless Heater Corp., Cleveland.
●Forest City Foundries Co., Cleveland, O.
Gascol Furnace Co., The, Pittsburgh.
Green Foundry & Furnace Wks., Des Moines, Ia.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Fdy. Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
Ideal Furnace Co., Detroit, Mich.
Ingersoll Steel & Disc. Div., Borg-Warner Corp., Chicago.
International Heater Co., Utica, N. Y.
Jackson & Church Co., Saginaw, Mich.
Joliet Heating Corp., Joliet, Ill.
Kalamazoo Stove & Furnace Company, Kalamazoo, Mich.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
Lennox Furnace Co., Marshalltown, Ia.
Liberty Foundry Co., St. Louis, Mo.
McPherson Furnace & Supply Co., Portland, Ore.
●Majestic Co., Huntington, Ind.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit, Mich.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit, Mich.
Naylor Corp., Air Cond. Div., Chicago, Ill.
Nelson Corp., Herman, Moline, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Pocahontas Fuel Corp., Stoker Div., Cleveland.
Portland Stove Foundry Co., Portland, Me.
Richardson & Boynton Co., New York City.
Robinson Furnace Co., Chicago.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Schill Mfg. Co., Crestline, O.
Spencer Heater Division, Williamsport, Pa.
Standard Furnace & Supply Co., Omaha, Nebr.
Thiele Furnace Co., Inc., Indianopolis, Ind.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Furnaces, Inc., Tacoma, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, AIR CONDITIONING, GAS, CAST IRON

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

●American Foundry & Furnace Co., Bloomington, Ill.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
●Airtemp Division, Chrysler Corporation, Dayton, O.
Bastain-Morley Co., Inc., LaPorte, Ind.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland.
●Cleveland Steel Products Corp., Cleveland.
●Forest City Foundries Co., Cleveland, O.
Green Foundry & Furnace Wks., Des Moines, Ia.
●Henry Furnace & Fdy. Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
●Majestic Co., Huntington, Ind.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Olsen Mfg. Co., C. A., Elyria, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Pennsylvania Furnace & Iron Co., Warren, Pa.
●Premier Furnace Co., Dowagiac, Mich.
Richmond Radiator Co., Inc., Uniontown, Pa.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
Sioux City Foundry and Boiler Company, Sioux City, Ia.
●Surface Combustion Corp., Toledo, O.
Thatcher Furnace Co., Newark, N. J.
Twentieth Century Heating & Ventilating Co., Akron, O.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
XXth Century Heating & Ventilating Co., Akron, O.
●Wise Furnace Co., Akron, O.
York Ice Machinery Corp., York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, GAS, STEEL

(Complete matched, gas-fired, furnace, fan, filter and humidifier unit)

●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Standard Gas Products Co., Detroit.
●Armstrong Furnace Co., Columbus, O.
Auburn Burner Co., Auburn, Ind.
Bard Mfg. Co., Bryan, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Corp., C. L., Cleveland, O.
Campbell Heating Co., E. K., Kansas City, Mo.
Campbell Heating Company, Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
●Century Engineering Corp., Cedar Rapids, Ia.
Conco Corporation, Mendota, Ill.
Corozone Air Conditioning Corp., The, Cleveland, O.
Dail Steel Products Co., Lansing Mich.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Dornback Furnace & Foundry Co., Cleveland.
Dunham Co., C. A., Chicago.
Electrogas Furnace Co., San Francisco, Cal.
●Fitzgibbons Boiler Co., Inc., New York City.
●Forest City Foundries Co., Cleveland.
Gascol Furnace Co., The, Pittsburgh.
Gasconaire, Inc., Detroit, Mich.
General Gas Light Co., Kalamazoo, Mich.
●General Electric Company, Bloomfield, N. J.
Green Foundry & Furnace Wks., Des Moines, Ia.
Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Heil Co., The, Milwaukee.
●Hess Warming & Ventilating Co., Chicago, Ill.
Huwer Heating Corp., Detroit.
Ideal Furnace Co., Detroit, Mich.
Ingersoll Steel & Disc. Div., Borg-Warner Corp., Chicago.
Independence Stove & Furnace Co., Independence, Mo.
Jackson & Church Co., Saginaw, Mich.
Johnston Gas Furnace Corp., North Hollywood, Cal.
Joliet Heating Corp., Joliet, Ill.
Kaustine Co., Inc., Perry, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kent Co., Inc., J. King, 6477 Manchester Ave., St. Louis.
Leeson Co., T. F., Detroit.
Lennox Furnace Co., Marshalltown, Ia.
●Lochinvar Corp., Dearborn, Mich.
●Majestic Co., Huntington, Ind.
Marion Furnace Co., Detroit.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit, Mich.
Moncrief Furnace & Mfg. Co., Inc., Dallas, Texas.

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●Mueller Furnace Co., L. J., Milwaukee, Wis.
Naylor Corporation, Chicago.
National Manufacturing & Eng. Co., Detroit, Mich.
Nelson Corp., Herman, Moline, Ill.
New Mission Htg. & Vent. Co., San Francisco, Cal.
●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
Northern Furnace & Supply Co., Billings, Mont.
Ohio Foundry & Mfg. Co., Steubenville, O.
Olsen Mfg. Co., C. A., Elyria, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Patten Co., J. V., Sycamore, Ill.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Perfection Stove Co., Cleveland, O.
Pernot & Rich, Inc., Los Angeles, Cal.
●Premier Furnace Company, Dowagiac, Mich.
Reif-Rexoil, Inc., Buffalo, N. Y.
Reznor Mfg. Co., Mercer, Pa.
Robinson Furnace Co., Chicago.
Royal Air Conditioning Equipment, Compton, Cal.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
Schill Mfg. Co., Crestline, O.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Season-Aire Corporation of America, Detroit.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Star Radiator Co., Los Angeles, Cal.
●Surface Combustion Corp., Toledo, O.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit, Mich.
●Waterman-Waterbury Co., Minneapolis, Minn.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Wise Furnace Co., Akron, O.
●Williamson Heater Co., Cincinnati, O.
●Wood Industries, Inc., Gar, Detroit.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, AIR CONDITIONING, OIL, CAST IRON—BURNER FURNISHED

(Complete matched, oil-burning furnace (with burner) fan, filter and humidifier unit)

●American Foundry & Furnace Co., Bloomington, Ill.
●Chandler Co., Cedar Rapids, Ia.
●Excelsior Steel Furnace Co., Chicago.
Keith Furnace Co., Des Moines, Ia.
●Majestic Co., Huntington, Ind.
May Oil Burner Corp., Baltimore.
Montag Stove & Furnace Works, Portland, Ore.
Portland Stove Foundry Co., Portland, Me.
Rudy Furnace Co., Dowagiac, Mich.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Westwick & Son, Inc., John, Galena, Ill.

FURNACES, WARM AIR, AIR CONDITIONING, OIL, STEEL—BURNER FURNISHED

(Complete matched, oil-burning furnace (with burner) fan, filter and humidifier unit)

Acme Oil Burner Company, Inc., Cedar Rapids, Ia.
AireOzone Corporation, Chicago.
●Airtemp Division Chrysler Corp., Dayton, Ohio.
American Air Conditioning Corp., Sebastopol, Cal.
American Furnace Co., St. Louis.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
Auburn Burner Co., Auburn, Ind.
Automatic Burner Corporation, Chicago.
Automatic Burner Corporation, Chicago.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
Bard Mfg. Co., Bryan, Ohio.
Beck Engineering Combustion Kompany, St. Louis.
Bryant Corp., C. L., Cleveland.
Calesco Corporation, Lynn, Mass.
Campbell Heating Co., Des Moines, Ia.
Carrier Corp., Syracuse, N. Y.
Cary Manufacturing Co., Waupaca, Wis.
●Century Engineering Corporation, Cedar Rapids, Iowa.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Conco Corporation, Mendota, Ill.
Corozone Air Conditioning Corp., The, Cleveland.
Dail Steel Products Co., Lansing, Mich.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Easternoil, Inc., Portland, Me.
Electrol Incorporated, Clifton, N. J.
Evans Corp., George, Moline, Ill.
●Excelsior Steel Furnace Co., Chicago.
●Farquhar Furnace Co., Wilmington, O.
Fluid Heat Div., Anchor Post Fence Co., Baltimore.
●Forest City Foundries Co., Cleveland.
Gehri Co., Tacoma, Wash.
●General Electric Co., Bloomfield, N. J.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Green Foundry & Furnace Wks., Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harvey-Whipple, Inc., Springfield, Mass.
●Heil Co., Milwaukee.
●Hess Warming & Ventilating Co., Chicago.
Hipoint Corp., Bellefontaine, O.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
Huwer Heating Corp., Detroit.
Hotentot Co., Inc., Omaha, Nebr.
Jackson & Church Co., Saginaw, Mich.
Joliet Heating Corp., Joliet, Ill.
●Johnson Co., S. T., Oakland, Cal., and Philadelphia.
Kalamazoo Stove & Furnace Company, Kalamazoo, Mich.
Kaustine Co., Inc., Perry, N. Y.
Kleen-Heet, Inc., Chicago.
Keith Furnace Co., Des Moines, Ia.
Lennox Furnace Co., Marshalltown, Iowa.
Little Burner Co., Inc., H. C., San Rafael, Cal.
●Lochinvar Corp., Dearborn, Mich.
McPherson Furnace & Supply Co., Portland, Ore.
Marion Furnace Co., Detroit.
May Oil Burner Corp., Baltimore, Md.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
Motor Wheel Corporation, Duo-Therm Div., Lansing, Mich.
●Mueller Furnace Co., L. J., Milwaukee.
National Iron Works, San Diego, Cal.
National Manufacturing & Eng. Co., Detroit.
Naylor Corp., Air Cond. Div., Chicago.
Nelson Company, Detroit.
Nelson Corp., Herman, Moline, Ill.
●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit.
Nu-Way Corp., Rock Island, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
Patten Co., J. V., Sycamore, Ill.
Ray Oil Burner Co., San Francisco.
●Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Perfection Stove Co, Cleveland.
Petroleum Heat & Power Co., Stamford, Conn.
Quaker Mfg. Co., Chicago.
Reif-Rexoil, Inc., Buffalo, N. Y.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Season-Aire Corporation of America, Detroit.
Scott-Newcomb, Inc., St. Louis.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Silent Sioux Oil Burner Corp., Orange City, Ia.
Standard Furnace & Supply Co., Omaha, Nebr.
Sundstrand Engineering Company, Rockford, Ill.
Syncro-Flame Burner Corp., Willimantic, Conn.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit.
Viking Mfg. Co., Seville, O.
●Waterman-Waterbury Co., Minneapolis.
Wayne Oil Burner Corporation, Fort Wayne, Ind.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
Westwick & Son, Inc., John, Galena, Ill.
●Williamson Heater Co., Cincinnati.
●Wood Industries, Inc., Gar, Detroit.
York Ice Machinery Corp., York, Pa.
York Oil Burner Company, Inc., York, Pa.

FURNACES, WARM AIR, AIR CONDITIONING, OIL, CAST IRON—NO BURNER FURNISHED

(Complete matched oil-burning furnace (without burner), fan, filter and humidifier unit)

●American Foundry & Furnace Co., Bloomington, Ill.
●Chandler Co., Cedar Rapids, Iowa.
Dail Steel Products Co., Lansing, Mich.
Hess-Snyder Co., Massillon, Ohio.
Home Furnace Co., Holland, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Iowa.
Kelsey Heating Co., Inc., Syracuse, N. Y.
Liberty Foundry Co., St. Louis.
●Majestic Co., Huntington, Ind.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee.
Olsen Mfg. Co., C. A., Elyria, O.
●Premier Furnace Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Sioux City Foundry & Boiler Co., Sioux City, Ia.
Standard Furnace & Supply Co., Omaha, Nebr.
Thiele Furnace Co., Inc., Indianapolis, Ind.

FURNACES, WARM AIR, AIR CONDITIONING, OIL, STEEL—NO BURNER FURNISHED

(Complete matched oil-burning furnace (without burner), fan, filter and humidifier unit)

American Air Conditioning Corp., Sebastopol, Cal.
●American Foundry & Furnace Co., Bloomington, Ill.

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American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee.
●Armstrong Furnace Co., Columbus, Ohio.
Atlas Heating & Ventilating Co., Ltd., San Francisco.
Auburn Burner Co., Auburn, Ind.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
Bard Mfg. Co., Bryan, Ohio.
Beck Engineering Combustion Kompany, St. Louis.
Bryant Corp., C. L., Cleveland.
Calesco Corp., Lynn, Mass.
Campbell Heating Co., Des Moines, Iowa.
Campbell Heating Co., E. K., Kansas City, Mo.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Dail Steel Products Co., Lansing, Mich.
Easternoil, Inc., Portland, Me.
Evans Corp., George, Moline, Ill.
●Fitzgibbons Boiler Co., Inc., New York City.
Gehri Co., Tacoma, Wash.
Glasby Manufacturing Co., Inc., J. P., Bloomfield, N. J.
Green Foundry & Furnace Wks., Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Fdy. Co., Cleveland.
Hess-Snyder Co., Massillon, Ohio.
●Hess Warming & Ventilating Co., Chicago.
Hotentot Co., Inc., Omaha, Nebr.
International Heater Co., Utica, N. Y.
Jackson & Church Co., Saginaw, Mich.
Joliet Heating Corp., Joliet, Ill.
Kaustine Co., Inc., Perry, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
Knowles Air Conditioning, Minneapolis.
Lennox Furnace Co., Marshalltown, Iowa.
Liberty Foundry Co., St. Louis.
●Majestic Co., Huntington, Ind.
Marion Furnace Co., Detroit.
May-Fiebeger Co., Newark, Ohio.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee.
National Iron Works, San Diego, Cal.
National Manufacturing & Eng. Co., Detroit.
Naylor Corporation, Air Cond. Div., Chicago.
Nelson Company, Detroit.
Olsen Mfg. Co., C. A., Elyria, O.
Patten Co., J. V., Sycamore, Ill.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Schwab Furnace & Mfg. Co., Milwaukee.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Season-Aire Corporation of America, Detroit.
United States Radiator Corp., Detroit.
●Waterman-Waterbury Co., Minneapolis.
Western Blower Company, Seattle, Wash.
●Williamson Heater Co., Cincinnati, O.

FURNACES, WARM AIR, AIR CONDITIONING, STOKER, CAST IRON—STOKER FURNISHED

(Complete matched stoker-furnace (with stoker), fan, filter and humidifier unit)

●American Foundry & Furnace Co., Bloomington, Ill.
●Chandler Co., Cedar Rapids, Iowa.
Dail Steel Products Co., Lansing, Mich.
●Excelsior Steel Furnace Co., Chicago.
Keith Furnace Co., Des Moines, Ia.
Olsen Mfg. Co., C. A., Elyria, O.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Schwab Furnace & Mfg. Co., Milwaukee.
Spencer Heater Division, Williamsport, Pa. (Gravity Stoker)

FURNACES, WARM AIR, AIR CONDITIONING, STOKER, STEEL—STOKER FURNISHED

(Complete matched stoker-furnace (with stoker), fan, filter and humidifier unit)

American Furnace Co., St. Louis.
Auburn Burner Co., Auburn, Ind.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
Campbell Heating Co., Des Moines, Ia.
●Chandler Co., Cedar Rapids, Ia.
Conco Corporation, Mendota, Ill.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Hess Warming & Ventilating Co., Chicago.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
McPherson Furnace & Supply Co., Portland, Ore.
●Meyer Furnace Co., Peoria, Ill.
Nelson Company, Detroit.
Olsen Mfg. Co., C. A., Elyria, O.
Pocahontas Fuel Corp., Stoker Div., Cleveland.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Stok-A-Fire Co., Inc., University City, Mo.

FURNACES, WARM AIR, AIR CONDITIONING, STOKER, CAST IRON—NO STOKER FURNISHED

(Complete matched stoker-furnace (without stoker), fan, filter and humidifier unit)

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
●Chandler Co., Cedar Rapids, Iowa.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Dail Steel Products Co., Lansing, Mich.
●Excelsior Steel Furnace Co., Chicago.
●Forest City Foundries Co., Cleveland.
Hess-Snyder Co., Massillon, O.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
●Majestic Co., Huntington, Ind.
May-Fiebeger Co., Newark, Ohio.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee.
Olsen Mfg. Co., C. A., Elyria, O.
●St. Louis Furnace Manufacturing Co., St. Louis.
Schwab Furnace & Mfg. Co., Milwaukee.
Sioux City Foundry & Boiler Co., Sioux City, Ia.
●Williamson Heater Co., Cincinnati.
●Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, AIR CONDITIONING, STOKER, STEEL—NO STOKER FURNISHED

(Complete matched stoker-furnace (without stoker), fan, filter and humidifier unit)

American Furnace Co., St. Louis.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee.
●Armstrong Furnace Co., Columbus, Ohio.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
Beck Engineering Combustion Kompany, St. Louis.
Campbell Heating Co., Des Moines, Ia.
Campbell Heating Co., E. K., Kansas City, Mo.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Dail Steel Products Co., Lansing, Mich.
●Excelsior Steel Furnace Co., Chicago.
●Fitzgibbons Boiler Co., Inc., New York City.
●Forest City Foundries Co., Cleveland.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Fdy. Co., Cleveland.
Hess-Snyder Co., Massillon, Ohio.
●Hess Warming & Ventilating Co., Chicago.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
Jackson & Church Co., Saginaw, Mich.
Joliet Heating Corp., Joliet, Ill.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
Lennox Furnace Co., Marshalltown, Iowa.
●Majestic Co., Huntington, Ind.
May-Fiebeger Co., Newark, Ohio.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
National Manufacturing & Engineering Co., Detroit.
Naylor Corporation, Air Cond. Div., Chicago.
Nelson Company, Detroit.
Olsen Mfg. Co., C. A., Elyria, O.
Patten Co., J. V., Sycamore, Ill.
●Premier Furnace Co., Dowagiac, Mich.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
●St. Louis Furnace Manufacturing Co., St. Louis, Mo.
Schwab Furnace & Mfg. Co., Milwaukee.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Thiele Furnace Co., Inc., Indianapolis, Ind.
●Waterman-Waterbury Co., Minneapolis.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, COAL, CAST IRON

Agricola Furnace Co., Inc., Gadsden, Ala.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

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Andes Range & Furnace Corp., Geneva, N. Y.
Barry Furnace Co., Hamilton, O.
Bergstrom Mfg. Corp., Neenah, Wis.
Brillion Furnace Co., Brillion, Wis.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Columbus Heating & Ventilating Co., Columbus, O.
Dail Steel Products Co., Lansing, Mich.
Danville Stove & Mfg. Co., Danville, Pa.
Des Moines Stove Repair Co., Des Moines, Ia.
Detroit Michigan Stove Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Emrich Co., Inc., Columbus, O.
Enterprise Foundry Co., Belleville, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Farris Furnace Co., Springfield, Ill.
●Faultless Heater Corp., Cleveland, O.
Favorite Stove Co., Piqua, O.
Floral City Co., Monroe, Mich.
Floyd-Wells Co., Royersford, Pa.
Foote Foundry Co., J. B., Fredericktown, O.
●Forest City Foundries Co., Cleveland, O.
Fuller-Warren Co., Milwaukee, Wis.
Germer Stove Co., Erie, Pa.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Hallstead Iron Foundry, Hallstead, Pa.
Harold Furnace Mfg. Co., Spokane, Wash.
Hart & Crouse Corporation, Utica, N. Y.
Hart Mfg. Co., Louisville, Ky.
Heckler Bros., Pittsburgh, Pa.
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
Home Furnace Co., Holland, Mich.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
Independence Stove & Furnace Co., Independence, Mo.
International Heater Co., Utica, N. Y.
Iowa Foundry Co., Sioux City, Ia.
Kalamazoo Stove & Furnace Co., Kalamazoo, Mich.
Kansas City Furnace Co., Kansas City, Mo.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Klein Stove Co., Philadelphia, Pa.
Liberty Foundry Co., St. Louis, Mo.
McPherson Furnace & Supply Co., Portland, Ore.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
●Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
Miller Range & Furnace Co., Wm., Cincinnati, O.
Montag Stove & Furnace Works, Portland, Ore.
Moore Corp., Joliet, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Oakland Foundry Co., Belleville, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
Orbon Stove Co., Belleville, Ill.
●Peerless Foundry Co., Indianapolis, Ind.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Pittston Stove Co., Pittston, Pa.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Co., Dowagiac, Mich.
Richardson & Boynton Co., New York City.
Robinson Furnace Co., Chicago, Ill.
Rock Island Stove Co., Rock Island, Ill.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
St. Clair Foundry Corp., Centralia, Ill.
●St. Louis Furnace Mfg. Co., St. Louis, Mo.
Schill Mfg. Co., Crestline, O.
Schwab Furnace & Mfg. Co., Milwaukee, Wis.
Security Stove & Mfg. Co., Kansas City, Mo
Sioux City Foundry and Boiler Co., Sioux City, Ia.
Spencer Heater Division, Williamsport, Pa. (Magazine feed)
Standard Furnace & Supply Co., Omaha, Nebr.
Stanton Heater Co., Martins Ferry, O.
Thatcher Furnace Co., Newark, N. J.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit, Mich.
Washington Stove Works, Everett, Wash.
Western Furnaces, Inc., Tacoma, Wash.
Westwick & Son, Inc., John, Galena, Ill.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, COAL, STEEL

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee, Wis.
Arcweld Mfg. Co., Inc., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Campbell Heating Co., Des Moines, Ia.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Dail Steel Products Co., Lansing, Mich.
Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
Deshler Foundry & Mach. Wks., Deshler, O.
Des Moines Stove Repair Co., Des Moines, Ia.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Emrich Co., Inc., Columbus, O.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Farquhar Furnace Co., Wilmington, O.
●Faultless Heater Corp., Cleveland, O.
Floral City Co., Monroe, Mich.
●Forest City Foundries Co., Cleveland, O.
Gascol Furnace Co., Pittsburgh (With gas burner)
Gehri Co., Tacoma, Wash.
Green Foundry & Furnace Works, Des Moines, Ia.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
Hall-Neal Furnace Co., Indianapolis, Ind.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co, Detroit, Mich
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
International Heater Co., Utica, N. Y.
Jackson & Church Co., Saginaw, Mich.
Joliet Heating Corp., Joliet, Ill.
Kalamazoo Stove & Furnace Company, Kalamazoo, Mich.
Keith Furnace Co., Des Moines, Ia.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lennox Furnace Co., Marshalltown, Ia.
Liberty Foundry Co., St. Louis, Mo.
Lookout Furnace Co., Chattanooga, Tenn.
●Majestic Co., Huntington, Ind.
Majestic Furnace Co., Seattle, Wash.
Marion Furnace Co., Detroit.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Mfg. & Engineering Co., Detroit.
Naylor Corporation, Air Cond. Div., Chicago.
Nugent Sons, Inc., Thos., New York City.
Olsen Mfg. Co., C. A., Elyria, O.
●Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Engineering Works, New Castle, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Co., Dowagiac, Mich.
Ramey Mfg. Co., Columbus, O.
Ribside Furnace Co., Wausau, Wis.
Roberts-Hamilton Co., Minneapolis, Minn.
Robinson Furnace Co., Chicago.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
●St. Louis Furnace Mfg. Co., St. Louis.
Schill Mfg. Co., Crestline, O.
Schwab Furnace & Mfg. Co., Milwaukee, Wis.
Sioux City Foundry and Boiler Co., Sioux City, Ia.
Standard Furnace & Supply Co., Omaha, Nebr.
Thatcher Furnace Company, Newark, N. J.
Thiele Furnace Co., Inc., Indianapolis, Ind.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit.
●Waterman-Waterbury Co., Minneapolis, Minn.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, FLOOR

(For suspension beneath floor)

AireOzone Corporation, Chicago. (Oil).
Alladdin Heating Corp., Oakland, Cal.
Andes Range & Furnace Corp., Geneva, N. Y.
●Armstrong Furnace Co., Columbus, O.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Beck Engineering Combustion Kompany, St. Louis.
Capps, Joseph, Inc., South Gate, Cal.
Coleman Lamp & Stove Co., Wichita, Kan.
Des Moines Steel Furnace Co., Des Moines, Ia.
Dallman Supply Co., Sacramento, Cal.
Day & Night Water Heater Co., Monrovia, Cal. (Gas).
East Anaheim Sheet Metal Works, Long Beach, Cal.

Electrogas Furnace Co., San Francisco, Cal. (Gas)
Familian Pipe & Supply Co., Los Angeles, Cal.
Heckler Bros., Pittsburgh, Pa. (Gas)
Holley Heating & Mfg. Co., Pasadena, Cal.
Ideal Heating Corp., Santa Monica, Cal.
King Metal Co., Oklahoma City, Okla.
Lennox Furnace Co., Marshalltown, Ia. (Gas)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Mayfair Furnace Co., Hollywood, Cal.
Miller Floor Furnace Co., Oakland, Cal.
Mission Water Heater Co., Los Angeles, Cal.
Monarch Heating Co., Los Angeles.
Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Gas)
●Mueller Furnace Co., L. J., Milwaukee, Wis. (Gas)
Ohio Foundry & Mfg. Co., Steubenville, O.
O'Keefe & Merritt Co., Los Angeles.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Palmers's Manufacturing Corp., Phoenix, Ariz.
Pennsylvania Furnace & Iron Co., Warren, Pa. (Gas)
Pioneer Water Heater Co., Los Angeles.
Rock Island Stove Co., Rock Island, Ill. (Coal)
Royal Air Conditioning Equipment, Compton, Cal. (Gas)
Rudy Furnace Co., Dowagiac, Mich.
Stephens Mfg. Co., Tulsa, Okla.
Sutphen & Co., J. W., Los Angeles.
●St. Louis Furnace Mfg. Co., St. Louis.
●Surface Combustion Corp., Toledo, O. (Gas)
Tennessee Enamel Mfg. Co., Nashville, Tenn.
Ward Heater Co., Ltd., Los Angeles.
Woods-Evertz Stove Co., Springfield, Mo.
Zink Co., John, Tulsa, Okla.

FURNACES, WARM AIR, GRAVITY, GAS, CAST IRON

(Complete with burner)

●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Co., Cleveland, O.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Dail Steel Products Co., Lansing, Mich.
Favorite Stove Co., Piqua, O.
●Forest City Foundries Co., Cleveland, O.
Green Foundry & Furnace Works, Des Moines, Ia.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland.
Hess-Snyder Co., Massillon, O.
Jackson Sheet Metal Works, Ogden, Utah. (Combination Iron and Steel)
Johnson Gas Furnace Corp., North Hollywood, Cal.
Kelsey Heating Co., Syracuse, N. Y.
Marvelaire Corp., West Los Angeles, Cal.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Olsen Mfg. Co., C. A., Elyria, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Reznor Mfg. Co., Mercer, Pa.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Company, Ashland, O.
●St. Louis Furnace Mfg. Co., St. Louis.
Sioux City Foundry & Boiler Co., Sioux City, Ia.
●Surface Combustion Corp., Toledo, O.
Ward Heater Co., Ltd., Los Angeles, Cal.
●Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, GAS, STEEL

(Complete with burner)

Alladdin Heating Corp., Oakland, Cal.
American Furnace Co., St. Louis, Mo.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Standard Gas Products Co., Detroit.
●Armstrong Furnace Co., Columbus, O.
Atlas Heating & Ventilating Co., Ltd., San Francisco, Cal.
Beck Engineering Combustion Kompany, St. Louis.
Bryant Corp., C. L., Cleveland O.
Burmester Gas Furnace Mfg. Co., Omaha, Nebr. (Sheet Iron)
Calkins & Pearce, Columbus, O.
●Century Engineering Corp., Cedar Rapids, Ia.
Cocking, Geo. J., Santa Ana, Cal.
Coleman Lamp & Stove Company, Wichita, Kansas.
Dail Steel Products Co., Lansing, Mich.
Des Moines Steel Furnace Co., Des Moines, Ia.
Detroit Michigan Stove Co., Detroit, Mich.
Dornbach Furnace & Foundry Co., Cleveland.
Electrogas Furnace Co., San Francisco, Cal.
●Forest City Foundries Co., The, Cleveland.
Gascol Furnace Co., Pittsburgh.
Green Foundry & Furnace Wks., Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Heckler Bros., Pittsburgh, Pa.
●Henry Furnace & Foundry Co., Cleveland.
Hess-Snyder Co., Massillon, O.
Holley Heating & Mfg. Co., Pasadena, Cal.
Hotentot Company, Inc., Omaha, Nebr.
Independence Stove & Furnace Co., Independence, Mo.
Jackson & Church Co., Saginaw, Mich.
Johnston Gas Furnace Corp., North Hollywood, Cal.
Lennox Furnace Co., Marshalltown, Ia.
Marion Furnace Co., Detroit.
May-Fiebeger Co., Newark, O.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Iron Works, San Diego, Cal.
National Mfg. & Engineering Co., Detroit.
Naylor Corporation, Air Cond. Div., Chicago.
New Mission Heating & Ventilating Co., San Francisco.
Olsen Mfg. Co., C. A., Elyria, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Palmer's Manufacturing Corp., Phoenix, Ariz.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Perfection Stove Co., Cleveland,
Royal Air Conditioning Equipment, Compton, Cal.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
●St. Louis Furnace Mfg. Co., St. Louis.
Scott-Newcomb, Inc., St. Louis, Mo.
Season-Aire Corporation of America, Detroit.
Security Stove & Mfg. Co., Kansas City, Mo.
Star Radiator Co., Los Angeles.
●Surface Combustion Corp., Toledo, O.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit.
Ward Heater Co., Ltd., Los Angeles, Cal.
●Waterman-Waterbury Co., Minneapolis, Minn.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, OIL, CAST IRON

(No burner furnished)

Airtherm Mfg. Co., St. Louis, Mo.
●Chandler Co., Cedar Rapids, Ia.
Detroit Michigan Stove Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Co., Monroe, Mich.
Green Foundry & Furnace Works, Des Moines, Ia.
Hart & Crouse Corporation, Utica, N. Y.
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee.
Olsen Mfg. Co., C. A., Elyria, O.
●St. Louis Furnace Mfg. Co., St. Louis.
Schwab Furnace & Mfg Co., Milwaukee, Wis.
Sioux City Foundry & Boiler Co., Sioux City, Ia.
Thatcher Furnace Company, Newark, N. J.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.

FURNACES, WARM AIR, GRAVITY, OIL, STEEL

(No burner furnished)

American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
American Welding & Engineering Corp., Milwaukee.
Arcweld Mfg. Co., Inc., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Bard Manufacturing Co., Bryan, O.
Beck Engineering Combustion Kompany, St. Louis.
Calesco Corporation, Lynn, Mass.
Campbell Heating Co., Des Moines, Ia.
Cary Mfg. Co., Waupaca, Wis.
Dail Steel Products Co., Lansing, Mich.
Des Moines Steel Furnace Co., Des Moines, Ia.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Economy Baler Co., Ann Arbor, Mich.
●Excelsior Steel Furnace Co., Chicago, Ill.
●Farquhar Furnace Co., Wilmington, O.
Floral City Co., Monroe, Mich.
Gehri Co., Tacoma, Wash.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
●Hess Warming & Ventilating Co., Chicago, Ill.
Hotentot Co., Inc., Omaha, Nebr.
Ideal Furnace Co., Detroit, Mich.
Jackson & Church Co., Saginaw, Mich.
Joliet Heating Corp., Joliet, Ill.

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Keith Furnace Co., Des Moines, Ia.
Knowles Air Conditioning, Minneapolis.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lennox Furnace Co., Marshalltown, Ia.
Liberty Foundry Co., St. Louis, Mo.
Lookout Furnace Co., Chattanooga, Tenn.
May Fiebeger Co., Newark, Ohio.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit, Mich.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Iron Works, San Diego, Cal.
Naylor Corporation, Air Cond. Div., Chicago.
Olsen Mfg. Co., C. A., Elyria, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Co., Dowagiac, Mich.
Rock Island Stove Co., Rock Island, Ill.
Rosebraugh Co., W. W., Salem, Ore.
●Round Oak Co., Dowagiac, Mich.
●St. Louis Furnace Mfg. Co., St. Louis.
Scott-Newcomb, Inc., St. Louis, Mo.
Schwab Furnace & Mfg Co., Milwaukee, Wis.
Season-Aire Corporation of America, Detroit.
Sioux City Foundry & Boiler Co., Sioux City, Ia.
Thatcher Furnace Company, Newark, N. J.
Thiele Furnace Co., Indianapolis, Ind.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit.
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Company, Seattle, Wash.
Westinghouse Electric & Mfg. Co., East Springfield, Mass.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, OIL, CAST IRON

(Complete with burner)

American Furnace & Foundry Co., Milan, Mich.
Arcweld Mfg. Co., Seattle, Wash.
●Chandler Co., Cedar Rapids, Iowa.
Green Foundry & Furnace Works, Des Moines, Ia.
Harvey-Whipple, Inc., Springfield, Mass.
Keith Furnace Co., Des Moines, Ia.
Olsen Mfg. Co., C. A., Elyria, O.
●St. Louis Furnace Mfg. Co., St. Louis.

FURNACES, WARM AIR, GRAVITY, OIL, STEEL

(Complete with burner)

American Air Conditioning Corp., Sebastopol, Cal.
American Furnace Co., St. Louis, Mo.
Arcweld Mfg. Co., Inc., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, O.
Beck Engineering Combustion Kompany, St. Louis.
Calesco Corporation, Lynn, Mass.
Cary Mfg. Co., Waupaca, Wis.
●Century Engineering Corp., Cedar Rapids, Iowa.
Dail Steel Products Co., Lansing, Mich.
Des Moines Steel Furnace Co., Des Moines, Ia.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harvey-Whipple, Inc., Springfield, Mass.
●Hess Warming & Ventilating Co., Chicago.
Hotentot Co., Inc., Omaha, Nebr.
Jackson & Church Co., Saginaw, Mich.
Johnston Gas Furnace Corp., North Hollywood, Cal.
Joliet Heating Corp., Joliet, Ill.
Keith Furnace Co., Des Moines, Ia.
Koons Furnace Co., Danville, Ill.
Lennox Furnace Co., Marshalltown, Ia.
Little Burner Co., Inc., H. C., San Rafael, Cal.
●Lochinvar Corp., Dearborn, Mich.
May-Fiebeger Co., Newark, Ohio.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
Motor Wheel Corporation, Duo-Therm Div., Lansing, Mich.
National Iron Works, San Diego, Cal.
Naylor Corporation, Air Cond. Div., Chicago.
●Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.
Olsen Mfg. Co., C. A., Elyria, O.
Perfection Stove Co., Cleveland, O.
Petroleum Heat & Power Co., Stamford, Conn.
●St. Louis Furnace Mfg. Co., St. Louis.
Scott-Newcomb, Inc., St. Louis, Mo.
Season-Aire Corporation of America, Detroit.
●Waterman-Waterbury Co., Minneapolis, Minn.
●Wood Industries, Inc., Gar, Detroit, Mich.

FURNACES, WARM AIR, GRAVITY, STOKER, CAST IRON

(Stoker furnished)

Anchor Stove & Range Co., New Albany, Ind.
●Chandler Co., Cedar Rapids, Ia.
●Excelsior Steel Furnace Co., Chicago, Ill.
Hall-Neal Furnace Co., Indianapolis, Ind.
Keith Furnace Co., Des Moines, Ia.
●Majestic Co., Huntington, Ind.
●Meyer Furnace Co., Peoria, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
Rudy Furnace Co., Dowagiac, Mich.
Schwab Furnace & Mfg. Co., Milwaukee.

FURNACES, WARM AIR, GRAVITY, STOKER, CAST IRON

(No stoker furnished)

American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
●Chandler Co., Cedar Rapids, Iowa.
●Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Co., Monroe, Mich.
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Inc., Syracuse, N. Y.
●Majestic Co., Huntington, Ind.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co, L. J., Milwaukee. (Double Radiator)
Olsen Mfg. Co., C. A., Elyria, O.
●Premier Furnace Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Schwab Furnace & Mfg. Co., Milwaukee.
Sioux City Fdy. & Boiler Co., Sioux City, Ia.
●Wise Furnace Co., Akron, O.

FURNACES, WARM AIR, GRAVITY, STOKER, STEEL

(Stoker furnished)

●Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
Beck Engineering Combustion Kompany, St. Louis.
●Excelsior Steel Furnace Co., Chicago, Ill.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Hess Warming & Ventilating Co., Chicago, Ill.
Keith Furnace Co., Des Moines, Ia.
●Majestic Co., Huntington, Ind.
●Meyer Furnace Co., Peoria, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
●St. Louis Furnace Mfg. Co., St. Louis.
Schwab Furnace & Mfg Co., Milwaukee.
●Schwitzer-Cummins Co., Indianapolis, Ind.

FURNACES, WARM AIR, GRAVITY, STOKER, STEEL

(No stoker furnished)

American Welding & Engineering Corp., Milwaukee.
Arcweld Mfg. Co., Inc., Seattle, Wash.
●Armstrong Furnace Co., Columbus, O.
Baker Furnace & Cleaner Mfg. Co., Toledo, Ohio.
●Excelsior Steel Furnace Co., Chicago, Ill.
Floral City Co., Monroe, Mich.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
Hall-Neal Furnace Co., Indianapolis, Ind.
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
●Hess Warming & Ventilating Co., Chicago, Ill.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.
Jackson & Church Co., Saginaw, Mich.
Keith Furnace Co., Des Moines, Ia.
Lookout Furnace Co., Chattanooga, Tenn.
●Majestic Co., Huntington, Ind.
May-Fiebeger Co., Newark, Ohio.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Naylor Corporation, Air Cond. Div., Chicago.
Olsen Mfg. Co., C. A., Elyria, O.
●Premier Furnace Co., Dowagiac, Mich.
●Round Oak Co., Dowagiac, Mich.
●St. Louis Furnace Mfg. Co., St. Louis.
Schwab Furnace & Mfg. Co., Milwaukee.
●Waterman-Waterbury Co., Minneapolis, Minn.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.

● Advertisement in this issue. See Index to Advertisers, page 206

FURNACES, WARM AIR, HORIZONTAL

Acme Heating & Ventilating Co., Chicago, Ill.
●American Foundry & Furnace Co., Bloomington, Ill.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Campbell Heating Co., E. K., Kansas City, Mo.
Columbus Heating & Ventilating Co., Columbus, O.
Floral City Co., Monroe, Mich.
Jackson & Church Co., Saginaw, Mich.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
●Majestic Co., Huntington, Ind.
McPherson Furnace & Supply Co., Portland, Ore.
Moncrief Furnace Co., Atlanta, Ga.
Montag Stove & Furnace Works, Portland, Ore.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit.
Ramey Mfg. Co., Columbus, O.
Rosebraugh Co., W. W., Salem, Ore.
Twentienth Century Heating & Ventilating Co., Akron, O.
Western Blower Company, Seattle, Wash.
Western Furnaces, Inc., Tacoma, Wash.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, PIPELESS, CAST IRON

Agricola Furnace Co., Inc., Gadsden, Ala.
Airtherm Mfg. Co., St. Louis.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
Andes Range & Furnace Corp., Geneva, N. Y.
Barry Furnace Co., Hamilton, O.
Brillion Furnace Co., Brillion, Wis.
●Chandler Co., Cedar Rapids, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Danville Stove & Mfg. Co., Danville, Pa.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellboro, Pa.
Emrich Co., Inc., Columbus, O.
Enterprise Foundry Co., Belleville, Ill.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Favorite Stove Co., Piqua, O.
Floral City Co., Monroe, Mich.
Floyd-Wells Co., Royersford, Pa.
●Forest City Foundries Co., Cleveland, O.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Harold Furnace Mfg. Co., Spokane, Wash.
Hart & Crouse Corporation, Utica, N. Y.
Hart Mfg. Co., Louisville, Ky.
Heckler Bros., Pittsburgh, Pa.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
Independence Stove & Furnace Co., Independence, Mo.
Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.
Kansas City Furnace Co., Kansas City, Mo.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Liberty Foundry Co., St. Louis, Mo.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
Montag Stove & Furnace Works, Portland, Ore.
Moore Corp., Joliet, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Olsen Mfg. Co., C. A., Elyria, O.
Orbon Stove Co., Belleville, Ill.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Pittston Stove Co., Pittston, Pa.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Co., Dowagiac, Mich.
Ravenna Furnace & Heating Co., Ravenna, O.
Richardson & Boynton Co., New York City.
Robinson Furnace Co., Chicago, Ill.
Rudy Furnace Co., Dowagiac, Mich.
●Rybolt Heater Co., Ashland, O.
St. Clair Foundry Corp., Centralia, Ill.
●St. Louis Furnace Mfg. Co., St. Louis, Mo.
Schill Mfg. Co., Crestline, O.
Schwab Furnace & Mfg. Co., Milwaukee, Wis.
Security Stove & Mfg. Co., Kansas City, Mo.
Stiglitz Furnace & Foundry Co., Louisville, Ky.
Thatcher Furnace Co., Newark, N. J.
Twentieth Century Heating & Ventilating Co., Akron, O.
United States Radiator Corp., Detroit, Mich.
Ward Heater Co., Ltd., Los Angeles, Cal.
Washington Stove Works, Everett, Wash.
Western Furnaces, Inc., Tacoma, Wash.
Westwick & Son, Inc., John, Galena, Ill.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, PIPELESS, STEEL

Airtherm Manufacturing Co., St. Louis.
Alladdin Heating Corp., Oakland, Cal.
American Furnace & Foundry Co., Milan, Mich.
●Armstrong Furnace Co., Columbus, O.
Campbell Heating Co., Des Moines, Ia.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Electrogas Furnace Co., San Francisco, Cal.
Floral City Co., Monroe, Mich.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis.
Hart Mfg. Co., Louisville, Ky.
●Henry Furnace & Foundry Co., Cleveland, O.
●Hess Warming & Ventilating Co., Chicago, Ill.
Home Stove Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Klein Stove Co., Philadelphia, Pa.
Koons Furnace Co., Danville, Ill.
Kruse & Dewenter Co., Indianapolis, Ind.
Lennox Furnace Co., Marshalltown, Ia.
Liberty Foundry Co., St. Louis, Mo.
Majestic Furnace Co., Seattle, Wash.
May-Fiebeger Co., Newark, O.
●Meyer Furnace Co., Peoria, Ill.
●Michigan Tank & Furnace Corp., Detroit.
Montag Stove & Furnace Works, Portland, Ore.
National Iron Work, San Diego, Cal.
Naylor Corporation, Air Cond. Div., Chicago.
Nugent Sons, Inc., Thos., New York City.
Olsen Mfg. Co., C. A., Elyria, O.
Orbon Stove Co., Belleville, Ill.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Ramey Mfg. Co., Columbus, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Rosebraugh Co., W. W., Salem, Ore.
●St. Louis Furnace Mfg. Co., St. Louis, Mo.
Stanton Heater Co., Martins Ferry, O.
Stiglitz Furnace & Foundry Co., Louisville, Ky.
Twentieth Century Heating & Ventilating Co., Akron, O.
Ward Heater Co., Ltd., Los Angeles, Cal.
●Waterman-Waterbury Co., Minneapolis, Minn.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

FURNACES, WARM AIR, WOOD BURNING, CAST IRON

Floral City Co., Monroe, Mich.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Lennox Furnace Co., Marshalltown, Ia.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Oakland Foundry Co., Belleville, Ill.
Portland Stove Foundry Co., Portland, Me.
Western Furnaces, Inc., Tacoma, Wash.

FURNACES, WARM AIR, WOOD BURNING, STEEL

American Welding & Engineering Corp., Milwaukee, Wis.
Campbell Heating Co., E. K., Kansas City, Mo.
Daniels Mfg. Co., Inc., Sam, Hardwick, Vt.
Grossenbacher Steel Furnace & Mfg. Co., St. Louis, Mo.
●Hess Warming & Ventilating Co., Chicago, Ill.
Lennox Furnace Co., Marshalltown, Ia.
McPherson Furnace & Supply Co., Portland, Ore.
●Meyer Furnace Co., Peoria, Ill.
Rosebraugh Co., W. W., Salem, Ore.
Schwab Furnace & Mfg. Co., Milwaukee, Wis.

GAGES, AIR FILTER

Air Filter Engineering Co., Chicago.
Air Filter Service Co., Chicago.
●American Air Filter Co., Inc., Louisville, Ky.
Detroit Air Meter Co., Detroit.
Ellison Draft Gage Co., Chicago.
Friez & Sons, Julien P., Baltimore.
Hays Corporation, Michigan City, Ind.
Herbusch Corporation, Simplex Control Div., St. Louis.
Hill Co., E. Vernon, Chicago.
Huyette Co., Inc., Paul B., Philadelphia.

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GAGES, INDICATING, DRAFT, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Defender Automatic Regulator Co., St. Louis.
Detroit Air Meter Co., Detroit.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore, Md.
Hays Corp., Michigan City, Ind.
Hill Co., E. Vernon, Chicago, Ill.
Hotstream Heater Co., The, Cleveland, O.
Meriam Co., Cleveland, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York City.

GLASS, WIRE, FOR SKYLIGHTS

●Atcheson Glass Co., T. J., Buffalo.
Mississippi Glass Company, New York City.

GRILLES, HEATING AND VENTILATING

●Air Control Products, Inc., Muskegon, Mich.
Aircraft Mfg. Co., Dayton, O.
●American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
●Auer Register Co., Cleveland, O.
●Barber-Colman Company, Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Campbell Heating Co., E. K., Kansas City, Mo.
Central Wire & Iron Works, Des Moines, Ia.
●Char-Gale Mfg. Co., Minneapolis.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Perforating Co., Chicago, Ill.
Cincinnati Mfg. Co., Cincinnati, O.
Cross Engineering Company, Carbondale, Pa.
Crown Iron Works, Minneapolis.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Eckenroth Register Co., San Francisco, Cal.
Erdle Perforating Co., Rochester, N. Y.
Falstrom Co., Passaic, N. J.
Gillian Mfg. Co., Detroit.
Globe Machine & Stamping Co., Cleveland, O.
●Harrington & King Perforating Co., Chicago, Ill.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
●Independent Register Co., Cleveland, O.
●Lamneck Products, Inc., Columbus, O.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Metalace Corp., South Boston, Mass.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Mundt & Sons, Charles, Jersey City, N. J.
Newman Brothers, Inc., Cincinnati, O.
●Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
●Standard Stamping & Perforating Co., Chicago.
Trane Co., La Crosse, Wis.
●Tuttle & Bailey, Inc., New Britain, Conn.
●U. S. Air Conditioning Corp., Minneapolis.
●United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia.
Western Wire & Iron Works, Inc., Chicago, Ill.
Wickwire Spencer Steel Co., New York City.

GRINDERS, BUFFERS, POLISHERS AND SANDERS

See Buffers, Grinders, Polishers and Sanders

GUARDS, SNOW

●Berger Brothers Co., Philadelphia, Pa.
Boyd & Co., Inc., Chas. P., Philadelphia.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
Folsom Snow Guard Co., Boston, Mass.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
●Levow, David, New York City.
Maysteel Products, Inc., Mayville, Wis.
Royal-Apex Mfg. Corp., Brooklyn, N. Y. (Cast Iron)
Western Wire & Iron Works, Inc., Chicago, Ill.
Wickwire Spencer Steel Co., New York City.

GUNS, SPRAY, METALS

Metals Coating Co. of America, Philadelphia, Pa.
Turner Brass Works, Sycamore, Ill.

GUNS, SPRAY, PAINT

Binks Mfg. Co., Chicago, Ill.
De Vilbiss Co., Toledo, O.
Electric Sprayit Co., Milwaukee, Wis.
Hobart Brothers Company, Troy, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Milburn Co., Alexander, Baltimore, Md.
Spray Engineering Co., Somerville, Mass.

GUTTERS

See Eaves Trough and Gutters

HARDWARE, FOR CABINETS AND CASINGS

(Handles, name plates, etc.)

American Cabinet Hardware Corp., Rockford, Ill. (Pulls, Knobs, Hinges, Catches, etc.)
American Emblem Co., Utica, N. Y. (name plates)
American Insulator Corp., New Freedom, Pa.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Crowe Name Plate & Mfg. Co., Chicago.
Dickey-Grabler Co., Cleveland (name plate)
Etched Products Co., Long Island City, N. Y. (name plates)
General Etching & Mfg. Co., Chicago (name plates)
Grammes, L. F., & Sons, Inc., Allentown, Pa.
Imperial Molded Products Corp., Chicago (Plastic handles, pulls and knobs)
Mason & Sons, F. E., Batavia, N. Y. (name plates)
Metal Marker Co., Cleveland. (name plates)
National Lock Co., Rockford, Ill.
Premier Metal Etching Co., Long Island City (name plates)
Soss Manufacturing Co., Roselle, N. J. (Invisible Hinges)
Stafford Co., N., Brooklyn, N. Y. (name plates)
Stanley Mfg. Co., Dayton, O. (name plates)

HEAT TRANSFER SURFACE

See Coils, Cooling, Direct Expansion; Coils, Heating; Coils, Cooling, Water

HEATERS, CIRCULATING, CABINET TYPE

Agricola Furnace Co., Inc., Gadsden, Ala.
American Furnace Co., St. Louis, Mo. (Gas and Oil)
Ames Co., W. R., San Francisco.
Auburn Burner Co., Auburn, Ind. (Oil)
Continental Stove Corp., Ironton, O. (Gas)
Corozone Air Conditioning Corp., Cleveland, O. (Gas and Oil)
Day & Night Water Heater Co., Monrovia, Cal. (Gas)
Edwards Manufacturing Co., Inc., Cincinnati (all fuels)
Estate Stove Co., Hamilton, O.
Evans Products Co., Evanoil Heater Div., Detroit. (Oil)
Florence Stove Co., Gardner, Mass.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Hart Mfg. Co., Louisville, Ky. (Coal and Gas)
Independence Stove & Furnace Co., Independence, Mo. (Gas or Coal)
Kalamazoo Stove and Furnace Co., Kalamazoo, Mich. (Coal, Oil or Wood)
Kleen-Heet, Inc., Chicago. (Oil)
Laco Oil Burner Co., Griswold, Ia. (Oil)
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Motor Wheel Corp., Duo-Therm Div., Lansing, Mich.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill. (Coal, Gas, Oil and Wood)
Ohio Foundry & Mfg. Co., Steubenville, O.
Orbon Stove Co., Belleville, Ill.
●Pacific Gas Radiator Co., Huntington Park, Cal.
Patten Co., J. V., Sycamore, Ill. (Coal, Oil and Gas)
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfection Stove Co., Cleveland. (Oil)
Pernot & Rich., Inc., Los Angeles.
Pittston Stove Co., Pittston, Pa.
Quaker Mfg. Co., Chicago, Ill. (Oil)
Reznor Mfg. Co., Mercer, Pa.
Shreveport Engineering Co., Inc., Shreveport, La.
Silent Glow Oil Burner Corp., Hartford, Conn.
Silent Sioux Oil Burner Corp., Orange City, Ia. (Oil)
●Surface Combustion Corp., Toledo, O. (Gas)
Tennessee Enamel Mfg. Co., Nashville, Tenn. (Gas)
Timken Silent Automatic Div., Timken-Detroit Axle Co., Detroit. (Oil)
Universal Utilities, Crestline, O. (Oil)
Victor Oil Burner Mfg. Co., Hartford, Conn.

HEATERS, SCHOOL ROOM

Agricola Furnace Co., Inc., Gadsden, Ala.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace & Foundry Co., Milan, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
Barry Furnace Co., Hamilton, O.
Brillion Furnace Co., Brillion, Wis.
Campbell Heating Co., Des Moines, Ia.
●Chandler Co., Cedar Rapids, Ia.
Corozone Air Conditioning Corp., Cleveland, O.
Daniels Mfg. Co., Inc., Sam, Hartwick, Vermont. (Wood)

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Danville Stove & Mfg. Co., Danville, Pa.
Des Moines Steel Furnace Co., Des Moines, Ia. (Oil)
Detroit Michigan Stove Co., Detroit, Mich.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
Edwards Furnace Co., Wellsboro, Pa.
Estate Stove Co., Hamilton, O.
●Excelsior Steel Furnace Co., Chicago.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Farris Furnace Co., Springfield, Ill.
Floral City Co., Monroe, Mich.
Green Foundry & Furnace Works, Des Moines, Ia.
Harold Furnace Mfg. Co., Spokane, Wash.
Hart & Crouse Corporation, Utica, N. Y.
Hart Mfg. Co., Louisville, Ky. (Coal and Gas)
●Henry Furnace & Foundry Co., Cleveland, O.
Hess-Snyder Co., Massillon, Ohio.
Home Stove Co., Indianapolis, Ind.
International Heater Co., Utica, N. Y.
Keith Furnace Co., Des Moines, Ia.
Kelsey Heating Co., Syracuse, N. Y.
Koons Furnace Co., Danville, Ill.
Lennox Furnace Co., Marshalltown, Ia.
Little Burner Co., Inc., H. C., San Rafael, Cal. (Oil)
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
May-Fiebeger Co., Newark, Ohio.
●Meyer Furnace Co., Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Moore Corp., Joliet, Ill.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
National Manufacturing & Engineering Co., Detroit.
Ohio Foundry and Manufacturing Co., Steubenville, O.
Orbon Stove Co., Belleville, Ill.
Patten Co., J. V., Sycamore, Ill. (Coal, Oil and Gas)
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfection Stove Co., Cleveland.
Pittston Stove Co., Pittston, Pa.
Portland Stove Foundry Co., Portland, Me.
●Premier Furnace Co., Dowagiac, Mich.
Quaker Mfg. Co., Chicago.
Rock Island Stove Co., Rock Island, Ill.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
St. Clair Foundry Corp., Centralia, Ill.
Sioux City Foundry and Boiler Co., Sioux City, Ia.
Tennessee Enamel Mfg. Co., Nashville, Tenn. (Gas)
Twentieth Century Heating & Ventilating Co., Akron, O.
Universal Utilities, Crestline, O. (Oil)
●Waterman-Waterbury Co., Minneapolis, Minn.
Western Blower Co., Seattle, Wash.
●Williamson Heater Co., Cincinnati, O.
●Wise Furnace Co., Akron, O.
XXth Century Heating & Ventilating Co., Akron, O.

HEATING COILS

See Coils, Heating

HOSE, METAL, FOR ELIMINATING COMPRESSOR VIBRATION

American Metal Hose Branch, American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York City.
Chicago Metal Hose Corporation, Maywood, Ill.
Eclipse Aviation, Div. Bendix Aviation Corp., Bendix, N. J.
Seamlex Co., Long Island City, N. Y.
Titeflex Metal Hose Co., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.

HOUSINGS, BLOWER

Brundage Co., Kalamazoo, Mich.
Detroit Stamping Co., Detroit. (For centrifugal wheels)
Economy Electric Mfg. Co., Cicero, Ill.
General Blower Corp., San Francisco.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
National Manufacturing & Engineering Co., Detroit.
St. Louis Blow Pipe & Heater Co., St. Louis.
●U. S. Air Conditioning Corp., Minneapolis.
●Viking Air Conditioning Corp., Cleveland.

HUMIDIFIER FITTINGS

See Fittings, Humidifier, Water Line

HUMIDIFIER VALVES

See Valves, Humidifier, Water Level

HUMIDIFIERS, FURNACE, EVAPORATION, AUTOMATIC

Agricola Furnace Co., Inc., Gadsden, Ala.
American Air Conditioning Co., Minneapolis, Minn.
●American Foundry & Furnace Co., Bloomington, Ill.
American Furnace & Foundry Co., Milan, Mich.
American Humidaire Corp., Grand Rapids, Mich.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
●Automatic Humidifier Co., Cedar Falls, Ia.
Badger Mfg. & Sales Co., Milwaukee.
Bishop Humidifier Co., Detroit, Mich.
Bryant Heater Co., Cleveland, O.
Calesco Corporation, Lynn, Mass.
Cary Mfg. Co., Waupaca, Wis.
●Chandler Co., Cedar Rapids, Ia.
Comfort Products Corporation, Harvey, Ill.
Des Moines Steel Furnace Co., Des Moines, Ia.
Des Moines Stove Repair Co., Des Moines, Ia.
Dowagiac Steel Furnace Co., Dowagiac, Mich.
●Excelsior Steel Furnace Co., Chicago, Ill.
Gardner Manufacturing Co., Horicon, Wis.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Health-O-Mist Humidifier Mfg. Co., Columbus, Wis.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Ideal Furnace Co., Detroit, Mich.
Iowa Foundry Co., Sioux City, Ia.
●Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kleenaire Corp., Stevens Point, Wis.
Kraker, Henry, Holland, Mich.
Lennox Furnace Co., Marshalltown, Iowa.
Little Burner Co., Inc., H. C., San Rafael, Cal.
●Maid-O'-Mist, Inc., Chicago, Ill.
Marshall Furnace Co., Marshall, Mich.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
●Monmouth Products Co., Cleveland, O.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Nugent Sons, Inc., Thos., New York City.
Pennsylvania Furnace & Iron Co., Warren, Pa.
●Premier Furnace Co., Dowagiac, Mich.
Richardson & Boynton Co., New York City.
Roberts-Hamilton Co., Minneapolis, Minn.
Rockford Brass Works, Rockford, Ill.
●Round Oak Co., Dowagiac, Mich.
Rudy Furnace Co., Dowagiac, Mich.
Sallada Mfg. Co., Minneapolis, Minn.
Security Stove & Mfg. Co., Kansas City, Mo.
Sioux City Foundry and Boiler Co., Sioux City, Ia.
Skilbeck Mfg. Co., Kenosha, Wis.
●Skuttle Co., J. L., Detroit, Mich.
Somers, Inc., H. J., Detroit, Mich.
Thatcher Furnace Co., Newark, N. J.
Universal Blower Co., Birmingham, Mich.
●Viking Air Conditioning Corp., Cleveland, O.
Western Blower Co., Seattle, Wash.
●Wise Furnace Co., Akron, O.

HUMIDIFIERS, FURNACE, SPRAY, AUTOMATIC

●Air Controls, Inc., Cleveland, O.
●American Foundry & Furnace Co., Bloomington, Ill.
●American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.
Binks Mfg. Co., Chicago, Ill.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brundage Co., Kalamazoo, Mich.
Bryant Heater Co., Cleveland, O.
Chelsea Fan & Blower Co., Inc., New York City.
Handelan Washed Air Co., Minneapolis, Minn.
Marshall Furnace Co., Marshall, Mich.
Mayflower Air-Conditioners, Inc., St. Paul.
●Meyer Furnace Co., Peoria, Ill.
Olsen Mfg. Co., C. A., Elyria, O.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Rega Mfg. Co., Rochester, N. Y.
Somers, Inc., H. J., Detroit, Mich.
Southworth Machine Co., Portland, Me.
Spray Engineering Co., Somerville, Mass.
Supreme Electric Products Corp., Rochester, N. Y.
Thatcher Furnace Co., Newark, N. J.
United American Bosch Corp., Springfield, Mass.
●U. S. Air Conditioning Corp., Minneapolis, Minn.

HUMIDISTATS

Atlas Valve Company, Newark, N. J. (Air Operated).
Au-Temp-Co Corp., New York City.
●Barber-Colman Co., Rockford, Ill.
Bristol Co., Waterbury, Conn.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore. (Human hair)
●General Electric Co., Bloomfield, N. J.
H-B Instrument Co., Inc., Philadelphia, Pa.
Johnson Service Co., Milwaukee, Wis.
Johnson Tool Co., East Providence, R. I.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn. (Human hair)
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Spencer Thermostat Co., Attleboro, Mass.

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Standard Engineering Works, Pawtucket, R. I.
Tagliabue Mfg. Co., C. J., Brooklyn.
Taylor Instrument Companies, Rochester, N. Y.

HUMIDITY CONTROLS

See Humidistats

HUMIDITY RECORDERS

See Recorders, Humidity

HYGROMETERS

Brown Instrument Co., Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Fee and Stemwedel, Inc., Chicago.
Friez & Sons, Julien P. Baltimore.
G. M. Manufacturing Co., New York City.
Johnson Service Co., Milwaukee, Wis.
Johnson Tool Co., Inc., East Providence, R. I.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
Moeller Instrument Co., Richmond Hill, New York City.
Palmer Co., Cincinnati.
Precision Thermometer and Instrument Co., Philadelphia.
Rochester Mfg. Co., Rochester, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn.
Taylor Instrument Companies, Rochester, N. Y.

INDICATORS, SOUND LEVEL

General Electric Co., Schenectady, N. Y.
Industrial Apparatus Co., Chicago.
Johns-Manville, New York City.

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Air-O-Cell Industries, Inc., Detroit.
Alfol Insulation Co., Inc., New York City. (Blanket)
Alton Mineral Wool Insulation Co., Alton, Ill.
Aluminum Aircell Insulation Co., Detroit.
American Flange & Mfg. Co., Inc., New York City.
American Hair & Felt Co., Chicago.
Armstrong Cork Co., Lancaster, Pa. (Cork)
Bache & Co., Semon, New York City.
Baldwin-Hill Co., Trenton, N. J. (Rockwool)
Barrett Co., New York City. (Tar felt and rockwool)
Berry Jr. & Co., Inc., F. E., Everett, Mass.
●Blocksom & Company Michigan City, Ind.
Butterworth Jr., B. T., New Canaan, Conn.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O.
Celotex Corp., Chicago, Ill.
Certain-teed Products Corp., New York City. (Rigid fibre)
Chamberlin Metal Weather Strip Co., Detroit.
Cork Import Corp., New York City. (Corkboard)
Cork Insulation Co., New York City. (Cork)
Cornell Wood Products Co., Chicago, Ill.
Crown Cork & Seal Co., Baltimore.
Doheny Co., John J., Belmont, Mass. (Blanket)
Eagle Picher Lead Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Flintkote Co., New York City. (Fibre board and rock wool)
Ford Roofing Products Co., Chicago. (Board and rock wool)
General Insulating & Mfg. Co., St. Louis. (Blanket)
General Insulating Products Co., Brooklyn, N. Y.
Hinde & Dauch Paper Co., Sandusky, O.
Insulite Co., Minneapolis, Minn.
International Vermiculite Co., Springfield, Ill.
Johns-Manville, New York City. (Rock wool, fibre board)
Johnston Tin Foil & Metal Co., St. Louis. (Paper backed foil)
Keasbey Co, Robert A., New York City.
Keasbey & Mattison Co., Ambler, Pa. (Mineral wool)
Kimberly-Clark Corp., Chicago.
Marblehead Lime Co., Chicago. (Rock wool)
Masonite Corp., Chicago, Ill. (Wood fibre)
Masonite Corp., Cellufoam Products Div., Chicago.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Minfelt Insulation Co., Toledo.
Mitchell & Smith, Inc., Detroit. (Cork)
Mundet Cork Corp., New York City. (Cork)
Munn and Steele, Inc., Newark, N. J. (Mica)
National Gypsum Co., Buffalo, N. Y.
Pacific Lumber Co., San Francisco, Cal. (Loose fill)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Plastergon Wall Board Co., Buffalo.
Refractory & Insulation Corp., New York City. (Loose granulated)
Rock Products Co., Nashville, Tenn.
Rock Wool Products Co., Inc., Wabash, Ind.
Ruberoid Co., New York City. (Rock wool and reflective)
Russell Co., F. C., Cleveland, O.
Specialty Converters, Inc., East Braintree, Mass.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Lime & Stone Co., Baltimore, Md.
Therminsul Corp. of America, Kalamazoo, Mich. (Bats, bulk, granulated)
Truscon Steel Co., Youngstown, O.
United Cork Companies, Kearney, N. J.
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., Chicago. (Rock wool)
Universal Gypsum & Lime Co., Chicago.
Upson Co., Lockport, N. Y.
●Wilson & Co., Inc., Chicago, Ill. (Haircraft)
●Wilson, Inc., Grant, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Detroit. (Loose fill)

INSULATION, DUCT, SOUND DEADENING

Acme Asbestos Covering & Flooring Co., Chicago.
Air Conditioning Utilities Co., New York City.
American Hair & Felt Co., Chicago, Ill.
Atlas Asbestos Co., Ltd., Montreal, Canada.
Barrett Co., New York City.
Burgess Battery Co., Chicago, Ill.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Cincinnati, O.
Celotex Corp., Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Co., Inc., Boston, Mass.
General Insulating & Mfg. Co., St. Louis.
Insulite Company, Minneapolis.
Johns-Manville, New York City.
Kimberly-Clark Corp., Chicago.
Masonite Corporation, Chicago. (Wood fibre)
Masonite Corp., Cellufoam Products Div., Chicago.
Maxim Silencer Co., Hartford, Conn.
Mitchell & Smith, Inc., Detroit. (Cork)
Mortell Co., J. W., Chicago, Ill. (Adhesive)
Munn and Steele, Inc., Newark, N. J.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
●Owens-Corning Fiberglas Corporation, Toledo.
Plant Rubber & Asbestos Works, San Francisco.
Western Felt Works, Chicago, Ill.
Western Silicair Products, Inc., Burbank, Cal.
●Wilson, Inc., Grant, Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Air Conditioning Utilities Co., New York City.
Alfol Insulation Co., Inc., New York City. (Aluminum foil)
American Flange & Mfg. Co., Inc., New York City.
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa.
Atlas Asbestos Co., Ltd., Montreal, Canada.
Barrett Co., New York City.
Baldwin-Hill Co., Trenton, N. J.
Berry Jr. & Co., Inc., F. E., Everett, Mass.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co. Philip, Cincinnati, O.
Celotex Corp., Chicago, Ill.
Cork Import Corp., New York City. (Corkboard)
Cork Insulation Co., Inc., New York City. (Cork)
Crown Cork & Seal Co., Baltimore.
Eagle-Picher Lead Co., Cincinnati, O. (Mineral wool, block, blanket)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Co., Inc., Boston.
Fir-Tex Insulating Board Co., St. Helens, Ore.
General Insulating Products Co., Brooklyn.
General Insulating & Mfg. Co., St. Louis.
International Vermiculite Co., Springfield, Ill.
Insul-Wool Insulation Corp., Wichita, Kansas.
Johns-Manville, New York City. (Rock cork)
Keasbey Co., Robert A., New York City.
Keasbey & Mattison Co., Ambler, Pa. (Asbestos air cell)
Kimberly-Clark Corp., Chicago.
Masonite Corp., Chicago, Ill. (Wood fibre)
Masonite Corp., Cellufoam Products Div., Chicago.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Minfelt Insulation Co., Toledo.
Mitchell & Smith, Inc., Detroit.
Mundet Cork Corp., New York City. (Cork)
Nelson Mfg. Co., B. F., Minneapolis.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
●Owens-Corning Fiberglas Corp., Toledo, Ohio.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Plant Rubber & Asbestos Works, San Francisco.
Presstite Engineering Co., St. Louis, Mo.
Refractory & Insulation Corp., New York City. (Inside Duct Lining)
Rock Wool Products Co., Inc., Wabash, Ind.
Ruberoid Co., New York City.
Russell Co., F. C., Cleveland, Ohio.
Sall Mountain Co., Chicago, Ill.
Schundler & Co., Inc., F. E., Joliet, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill.

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Therminsul Corp., Kalamazoo, Mich. (Block rock wool)
United Cork Companies, Kearney, N. J.
Western Felt Works, Chicago, Ill.
Western Silicair Products, Inc., Burbank, Cal.
●Wilson & Co., Inc., Chicago, Ill. (Hairbestos)
●Wilson, Inc., Grant, Chicago, Ill.
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Detroit, Mich.

INSULATION, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago.
Alfol Insulation Co., Inc., New York City.
Aluminum Aircell Insulation Co., Detroit. (Asbestos)
Baldwin-Hill Co., Trenton, N. J. (Asbestos cement)
Carey Co., Philip, Lockland, Cincinnati, O.
Eagle Picher Lead Co., Cincinnati, O. (Blocks)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
General Insulating & Mfg. Co., St. Louis (Blanket)
International Vermiculite Co., Springfield, Ill.
Johns-Manville, New York City. (All types)
Keasbey Co., Robert A., New York City (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago (Asbestos, mineral wool)
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Munn and Steele, Inc., Newark, N. J.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
●Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Cal.
Refractory & Insulation Corp., New York City.
Rock Wool Products Co., Inc., Wabash, Ind. (Rock wool)
Ruberoid Co., New York City.
Schundler & Co., Inc., F. E., Joliet, Ill.
Smidth & Co., F. L., New York City.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Lime & Stone Co., Baltimore. (Blankets, Cement)
Therminsul Corp., Kalamazoo, Mich. (Block rock wool.)
United States Gypsum Co., Chicago. (Asbestos)
●Wilson, Inc., Grant, Chicago, Ill.
Zonolite Co., Detroit, Mich.

LEADER STRAPS

See Fittings and Accessories, Conductor

LIFTS, SKYLIGHT

California Cornice, Steel & Supply Corp., Los Angeles.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati.
Dayton Greeenhouse Mfg. Co., Dayton, O.
Hudson Equipment Corp., Minneapolis, Minn.
●Levow, David, New York City. (Gearing)
Park City Cornice Works, Inc., Bridgeport, Conn.
Royal-Apex Mfg. Corp., Brooklyn, N. Y.
Schoedinger, F. O., Co., Columbus, O.
Van Noorden Co., E., Boston, Mass.
Weiss & Co., H., New York City.
Willis Mfg. Co., Galesburg, Ill.

LIGHTERS, FURNACE FIRE

American Furnace Lighter Sales Co., St. Louis.

LOUVRES AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

●Air Controls, Inc., Cleveland.
Air Conditioning Products Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
●Allen Corp., Detroit, Mich.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
●American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Ames Co., W. R., San Francisco, Cal.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
●Barber-Colman Co., Rockford, Ill.
Belanger Fan & Blower Co., Detroit.
Belco Exhaust Fan Mfg. Co., St. Louis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
California Cornice, Steel & Supply Corp., Los Angeles.
Campbell Heating Co., E. K., Kansas City, Mo.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Chicago Metal Mfg. Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., New York City.
Clay Equipment Corp., Cedar Falls, Ia.
Economy Electric Manufacturing Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago.
●Elgo Shutter & Mfg. Co., Detroit, Mich.
Falstrom Co., Passaic, N. J.
General Blower Co., Philadelphia.
General Regulator Corp., Chicago, Ill.
Gillian Mfg. Co., Detroit.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
International Engineering, Inc., Dayton, O.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kelvin-White Co., Boston, Mass.
King Ventilating Co., Owatonna, Minn.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kisco Company, Inc., St. Louis, Mo.
Lohman, Inc., William J., New York City.
Martin Metal Mfg. Co., Wichita, Kan.
Meier Electric & Machine Co., Indianapolis, Ind.
Meyer Mfg. Co., Detroit, Mich.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mountain States Equipment Co., Denver, Colo.
Myers Electric Co., Pittsburgh, Pa.
Peerless Electric Co., Warren, O.
Robertson Co., H. H., Pittsburgh, Pa.
Schoedinger Co., F. O., Columbus, O.
Signal Electric Mfg. Co., Menominee, Mich.
●Standard Stamping & Perforating Co., Chicago.
Supreme Heater & Ventilating Corp., St. Louis.
●Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
Utility Fan Corporation, Los Angeles, Cal.
Van Noorden Co., E., Boston, Mass.
Waterloo Register Co., Waterloo, Ia.
Willis Mfg. Co., Galesburg, Ill.

MACHINERY, REBUILT AND USED

●Interstate Machinery Co., Inc., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.
●Osborn Co., J. M. & L. A., Cleveland, O.
●St. Louis Tool Co., St. Louis.

MACHINES, BAR FOLDERS, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
●St. Louis Tool Co., St. Louis.

MACHINES, BAR FOLDERS, POWER

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, BEADING, HAND

●Niagara Machine & Tool Works, Buffalo.
Packham Crimper Co., Mechanicsburg, Ohio.
Peck, Stow & Wilcox Co., Southington, Conn.
●Robertson, F. L., Buffalo, N. Y.

MACHINES, BEADING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago, Ill.
Yoder Company, Cleveland, O.

MACHINES, BURRING, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, BURRING, POWER

Cincinnati Electrical Tool Co., The, Cincinnati, O.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Stow Mfg. Co., Binghamton, N. Y.

MACHINES, COMBINATION, HAND

(Beading, Burring, Turning, Wiring, etc.)

Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Packham Crimper Co., Mechanicsburg, Ohio. (Beading)
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, COMBINATION, POWER

(Beading, Burring, Turning, Wiring, etc.)

Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago, Ill.
Yoder Co., Cleveland, O.

MACHINES, CRIMPING, HAND

●Niagara Machine & Tool Works, Buffalo.
Packham Crimper Co., Mechanicsburg, Ohio.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, CRIMPING, POWER

Ingels Elbow Machine Corp., Chicago, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Yoder Co., Cleveland, O.

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MACHINES, ELBOW, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, ELBOW, POWER

Ingels Elbow Machine Corp., Chicago, Ill.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, FLANGING, HAND

Binkley Mfg. Co., Warrenton, Mo.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
"Original" Metal Flanging Machine Works, Seattle, Wash.
Peck, Stow & Wilcox Co., Southington, Conn.
●Ward Machinery Co., Chicago, Ill.
Weiss & Co., H., New York City.

MACHINES, FLANGING, POWER

Bittner Engineering Co., New York City.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Engineering and Research Corporation, Riverdale, Md.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
"Original" Metal Flanging Machine Works, Seattle, Wash.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago, Ill.
●Whitney Metal Tool Co., Rockford, Ill.
Yoder Co., Cleveland, O.

MACHINES, GROOVING, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, GROOVING, POWER

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Yoder Co., Cleveland, O.

MACHINES, GUTTER FORMING, HAND

●Robertson, F. L., Buffalo, N. Y.

MACHINES, NIBBLING, HAND

National Machine Tool Co., Racine, Wis.

MACHINES, NIBBLING, POWER

●Campbell, Andrew C., Div. of American Chain & Cable Co., Inc., Bridgeport, Conn.
●St. Louis Tool Co., St. Louis.
Savage Co., W. J., Knoxville, Tenn.

MACHINES, PITTSBURGH LOCK FORMING

Binkley Mfg. Co., Warrenton, Mo.
●Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago.
●Ward Machinery Co., Chicago, Ill.
●Whitney Metal Tool Co., Rockford, Ill.

MACHINES, SEAMING, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Weiss & Co., H., New York City.

MACHINES, SEAMING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago, Ill.
Yoder Co., Cleveland, O.

MACHINES, SETTING DOWN, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, SETTING DOWN, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, SHEET METAL SHRINKING, POWER

Engineering and Research Corporation, Riverdale, Md.

MACHINES, SLIP ROLL FORMING, HAND

Bertsch & Co., Cambridge City, Ind.
Hendley & Whittemore Co., Beloit, Wis.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, SLIP ROLL FORMING, POWER

Bertsch & Co., Cambridge City, Ind.
Hendley & Whittemore Co., Beloit, Wis.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, SLITTING, HAND

Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., Buffalo.
Hendley & Whittemore Co., Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Rafter Machine Co., Belleville, N. J.
●St. Louis Tool Co., St. Louis.
●Ward Machinery Co., Chicago, Ill.

MACHINES, SLITTING, POWER

Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., Buffalo.
Hendley & Whittemore Co., Beloit, Wis.
Libert Machine Co., Green Bay, Wis. (Rotary)
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago, Ill.
Rafter Machine Co., Belleville, N. J.
Yoder Co., Cleveland, O.

MACHINES, SQUARING, POWER

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, WIRING, HAND

Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.

MACHINES, WIRING, POWER

Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago, Ill.
Yoder Company, Cleveland, O.

MALLETS, METAL WORKING

Bersted Co., Martin, Chicago, Ill. (Molded composition)
Chicago Rawhide Mfg. Co., Chicago, Ill.
Electric Materials Co., North East, Pa. (Copper)
Fowler-Pem Co., Emeryville, Cal.
Miller Rubber Co., Inc., Akron, O. (Composition)
●Niagara Machine & Tool Works, Buffalo. (Hickory)
Peck, Stow & Wilcox Co., Southington, Conn. (Wood)
Stanley Tools, New Britain, Conn. (Soft face hammers, hickory, rubber composition)

METALS, PERFORATED, SHEET AND PLATE

Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Perforating Co., Chicago Ill.
Cross Engineering Co., Carbondale, Pa.
Crucible Steel Co. of America, New York City.
Erdle Perforating Co., Rochester, N. Y.
Fairmont Aluminum Co., Fairmont, W. Va.
Gillian Mfg. Co., Detroit.
Hall Metal Products Co., Long Beach, Cal.
●Harrington & King Perforating Co., Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
●International Nickel Co., Inc., New York City. (Monel and nickel)
Johnston & Chapman Co., Chicago, Ill.
Littleford Bros., Cincinnati, O.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Martin Metal Mfg. Co., Wichita, Kan.
Mundt & Sons, Charles, Jersey City, N. J.
Nortmann-Duffke Co., Milwaukee Wis.
Reliable Perforating Co., Chicago, Ill.
Revere Copper and Brass Incorporated, New York City.
●Standard Stamping & Perforating Co., Chicago, Ill.
Western Wire & Iron Works, Inc., Chicago, Ill.
Wickwire Spencer Steel Co., New York City.

METAL SPRAY GUNS

See Guns, Spray, Metals

METAL STAMPINGS

See Stampings, Metal

METERS, AIR VELOCITY, DIRECT READING

Detroit Air Meter Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore, Md.
●Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies Rochester, N. Y.

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MOTORS, DAMPER, DUCT, MODULATING OR PROPORTIONING

Au-Temp-Co Corp., New York City.
●Barber-Colman Co., Rockford, Ill.
●Janette Mfg. Co., Chicago, Ill.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Russell Electric Co., Chicago, Ill.
●White Manufacturing Co., St. Paul, Minn.

MOTORS, DAMPER, DUCT, TWO-POSITION

Au-Temp-Co. Corp., New York City.
Automatic Products Co., Milwaukee, Wis.
●Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore, Md.
●Janette Mfg. Co., Chicago, Ill.
●Mercoid Corp., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Sampsel Time Control, Inc., Mendota, Ill.
Sheer Co., H. M., Quincy, Ill.
●White Manufacturing Co., St. Paul, Minn.

MOTORS, DAMPER, FURNACE DRAFT, ELECTRICAL

Automatic Products Co., Milwaukee, Wis.
Au-Temp-Co. Corp., New York City.
●Barber-Colman Co., Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
Crise Electric Mfg. Co., Mount Vernon, O.
Defender Automatic Regulator Co., St. Louis.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore, Md.
●General Controls Co., Glendale, Cal.
●Gleason-Avery, Inc., Auburn, N. Y.
●Janette Mfg. Co., Chicago, Ill.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pioneer Heat Regulator Division, Master Electric Co., Dayton, O.
Russell Electric Co., Chicago, Ill.
Sampsel Time Control, Inc., Mendota, Ill.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Company, Attleboro, Mass.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis.

MOTORS, ELECTRIC, FRACTIONAL H. P.

Baldor Electric Co., St. Louis, Mo.
●Barber-Colman Co., Rockford, Ill. (A. C.)
Black & Decker Mfg. Co., Towson, Md.
Bodine Electric Co., Chicago, Ill.
Brown-Brockmeyer Co., Inc., Dayton, O
Canatsey Electric Mfg. Co., Kansas City, Mo.
●Century Electric Co., St. Louis, Mo.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Delco Products Division, General Motors Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
Emerson Electric Mfg. Co, St Louis, Mo.
General Electric Co., Schenectady, N. Y.
Holtzer-Cabot Electric Co., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
●Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Master Electric Co, Dayton, O
Ohio Electric Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Robbins & Myers, Inc., Springfield, O.
Reynolds Electric Company, Chicago.
Speedway Mfg. Co., Cicero, Ill.
Sterling Electric Motors, Inc., Los Angeles.
Sturtevant Co., B. F., Hyde Park, Boston.
U. S. Electrical Motors, Inc., Los Angeles.
●Victor Electric Products, Inc., Cincinnati, O.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

MOTORS, ELECTRIC, 1 H. P. AND OVER

Allis Co., Louis, Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis
Baldor Electric Co., St. Louis, Mo.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Erie, Pa.
Canatsey Electric Mfg. Co., Kansas City, Mo.
●Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Elec. Mfg. Co., Ampere, N. J.
Delco Products Division, General Motors Corp., Dayton, O.
Diehl Mfg. Co., Elizabethport, N. J.
Electric Machinery Mfg. Co., Minneapolis.
Emerson Electric Mfg. Co., St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Holtzer-Cabot Electric Co., Boston, Mass.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
●Janette Mfg. Co., Chicago, Ill.
Leland Electric Co., Dayton, O.
Lincoln Electric Co., Cleveland, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
Peerless Electric Co., Warren, O.
Philadelphia Gear Co., Philadelphia. (Geared)
Reliance Elec. & Eng. Co., Cleveland.
Robbins & Myers, Inc., Springfield, O.
Star Electric Motor Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles.
Sturtevant Co., B. F., Hyde Park, Boston.
U. S. Electrical Motors, Inc., Los Angeles.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Zobell Electric Motor Corp., Garwood, N. J.

MOULDING AND TRIM, ORNAMENTAL, for CABINETS and CASINGS

Allmetal Weatherstrip Co., Chicago, Ill.
Aluminum Co. of America, Pittsburgh, Pa.
Brasco Manufacturing Co., Harvey, Ill.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Empire Door Co., Inc., New York City.
Friedley-Voshardt Co., Chicago, Ill.
Herron-Zimmers Moulding Co., Detroit, Mich.
Ledkote Products Co., Long Island City, N. Y.
Martin-Parry Corp., York, Pa.
Maysteel Products, Inc., Mayville, Wis.
Mesker & Co., Geo. L., Evansville, Ind.
Miller & Doing, Inc., Brooklyn, N. Y.
Pyramid Metals Company, Chicago, Ill.

NAILS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Hassall, Inc., John, Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.

NAILS, COPPER

American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland, O.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
●Columbia Steel Co., San Francisco, Cal.
Copperweld Steel Co., Glassport, Pa.
Downs-Smith Brass & Copper Co., New York City.
Hassall, Inc., John, Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Maze Co., W. H., Peru, Ill.
Royal Metal Products Co., Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.

NAILS, HARDENED MASONRY

American Steel & Wire Co., Chicago, Ill.
Paine Co., Chicago.
●Parker-Kalon Corp., New York City.
Rawlplug Co., Inc., New York City.
Townsend Co., New Brighton, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

NAILS, ROOFING

●American Rolling Mill Co., Middletown, O.
American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland, O.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
●Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Deniston Co., Chicago, Ill.
Dickson Weatherproof Nail Co., Evanston, Ill. (Lead headed)
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Gulf States Steel Co., Birmingham, Ala.
Hassall, Inc., John, Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.

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Malleable Iron Fittings Co., Branford, Conn.
Maze Co., W. H., Peru, Ill.
●Milcor Steel Co., Milwaukee, Wis.
National Lead Co., New York City.
●Republic Steel Corp., Cleveland, O.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
●Youngstown Sheet & Tube Co., Youngstown, O.

NAILS, SCREW, HARDENED

Jones & Laughlin Steel Corp., Pittsburgh.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City.
●Republic Steel Corp., Cleveland, O.
Townsend Co., New Brighton, Pa.

NAILS, STAINLESS STEEL

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Crucible Steel Co. of America, New York City.
Hassall, Inc., John, Brooklyn, N. Y.
National Screw & Mfg. Co., Cleveland.
●Republic Steel Corp., Cleveland, O.
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.

NAILS, ZINC COATED

American Steel & Wire Co., Chicago, Ill.
American Zinc Products Co., Greencastle, Ind.
Angell Nail & Chaplet Co., Cleveland, O.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
●Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Hassall, Inc., John, Brooklyn, N. Y.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Malleable Iron Fittings Co., Branford, Conn.
Maze Co., W. H., Peru, Ill.
●Republic Steel Corporation, Cleveland.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Townsend Co., New Brighton, Pa.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
●Youngstown Sheet & Tube Co., Youngstown, O.

NIGHT AIR FANS

See Fans, Night Air Cooling

NOZZLES, SPRAY, WATER

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Balloffett Dies & Nozzle Co., Inc., Guttenberg, N. J.
Benjamin Air Rifle Co., St. Louis.
Betz Air Conditioning Corp., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Cooling Tower Co., Inc., Div. Fluor Corp. Ltd., New York City.
●Detroit Lubricator Co., Detroit.
Howell Mfg. Co., Kansas City, Mo.
Johnson Tool Co., Inc., East Providence, R. I.
Link-Belt Co., Chicago.
Marley Co., Kansas City, Kan.
Martocello & Co., Jos. A., Philadelphia, Pa.
Milburn Co., Alexander, Baltimore.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Peterson "Freezem" Mfg. & Sales Co., Kansas City, Mo.
Rega Mfg. Co., Rochester, N. Y.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Chicago, Ill.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Electric Products Corp., Rochester, N. Y.
Yarnall-Waring Company, Philadelphia.

NUTS, SHEET METAL

●Tinnerman Products, Inc., Cleveland.

OFFSETS, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

OIL BURNERS

See Burners, Oil

OZONE APPARATUS

American Hydrozone Co., Inc., Jersey City, N. J.
Automatic Pump & Softener Corp., Rockford, Ill.
Chelsea Fan & Blower Co., Inc., New York City.
Corozone Air Conditioning Corp., Cleveland, O.
Electroaire Corp., Chicago, Ill.
Kisco Company, Inc., St. Louis.
Lohman, Inc., Wm. J., New York City.
Montgomery Bros., San Francisco, Cal.
Norwood Engineering Co., The, Florence, Mass.
Ozone Air Company, Grand Rapids, Mich.
Ozo-Ray Process Corp., Chicago.
Sealkote Corp., Chicago, Ill.
United States Ozone Co. of America, Scottdale, Pa.

PAINT, ALUMINUM

Acme Refining Co., Cleveland, O.
Acorn Refining Co., Cleveland, O.
Aluminum Company of America, Pittsburgh, Pa.
Asphalt Products Co., Syracuse, N. Y.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carter Paint Co., Liberty, Ind.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, O.
Cork Import Corp., New York City.
Debevoise Co., Brooklyn, N. Y.
Ford Roofing Products Co., Chicago.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co. Div. of Glidden Co., Chicago, Ill.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Inter-Coastal Paint Co., East St. Louis, Ill.
Iowa Paint Mfg. Co., Des Moines, Ia.
Koppers Co., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago.
Lastik Products Co., Inc., Pittsburgh, Pa.
National Mfg. Corp., Tonawanda, N. Y.
O'Brien Varnish Co., South Bend, Ind.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pyrolite Products Co., Cleveland, O.
Robertson Co., H. H., Pittsburgh, Pa.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Sherwin-Williams Co., Cleveland.
Technical Coatings, Inc., Brooklyn, N. Y.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit.
Wailes Dove-Hermiston Corp., New York City.
Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.
Wilhelm Co., A., Reading, Pa.
X-Pando Corp., Long Island City, N. Y.

PAINT, CONCRETE, WATERPROOFING

Acme Refining Co., Cleveland, O.
Asphalt Products Co., Syracuse, N. Y.
Baer Brothers, New York City.
Barber Asphalt Corp., Barber, N. J.
Barrett Co., New York City.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co. Philadelphia, Pa.
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, Ohio.
Debevoise Co., Brooklyn, N. Y.
Flintkote Co., New York City.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., Cleveland, O.
Goodrich Co., B. F., Akron, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Klee Co., Geo. B., Cincinnati.
Koppers Co., Pittsburgh, Pa.
Lastik Products Co., Inc., Pittsburgh, Pa.
Metropolitan Refining Co., Long Island City, N. Y.
O'Brien Varnish Co., South Bend, Ind.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pecora Paint Co., Philadelphia, Pa.
Pyrolite Products Co., Cleveland, O.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh.
Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.
Sherwin-Williams Co., Cleveland.
Tamms Silica Co., Chicago, Ill.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United States Gypsum Co., Chicago, Ill.
Wailes Dove-Hermistor Corp., New York City.

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Wilhelm Co., A., Reading Pa.
X-Pando Corp., Long Island City, N. Y.

PAINT, COPPER

American Coppercote, Inc., Brooklyn, N. Y.
Debevoise Co., Brooklyn, N. Y.

PAINT, CRACKLE FINISH

Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hilo Varnish Corp., Brooklyn.
Inter-Coastal Paint Co., East St. Louis, Ill.
Iowa Paint Mfg. Co., Des Moines, Ia.
Maas & Waldstein Co., Newark, N. J.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Tropical Paint & Oil Co., Cleveland, O.
Wattenamel Co., Summit, Ill.
Wilhelm Co., A., Reading, Pa.
Zapon-Brevolite Division, Atlas Powder Co., North Chicago, Ill.

PAINT, HOT SURFACES

Acme Refining Co., Cleveland, O.
Acorn Refining Co., Cleveland, O.
American Chemical Paint Co., Ambler, Pa.
Barrett Co., New York City.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co. Philadelphia, Pa.
Carey Co., Philip, Lockland, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Continental Products Co., Euclid, Ohio.
Debevoise Co., Brooklyn, N. Y.
Gerard Chemical Co., Elizabeth, N. J.
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hetzel Roofing Products Co., Newark, N. J.
Hilo Varnish Corp., Brooklyn, N. Y.
Horn Co., A. C., Long Island City, N. Y.
Iowa Paint Mfg. Co., Des Moines, Ia.
Krehbiel Co., J. H., Chicago.
Laclede-Christy Clay Products Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsburgh, Pa.
Metropolitan Refining Co., Long Island City, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
O'Brien Varnish Co., South Bend, Ind.
Ohmlac Paint & Refining Co., Chicago, Ill.
Pyrolite Products Co., Cleveland, O.
Roxalin Flexible Lacquer Co., Inc., Elizabeth, N. J.
Sauereisen Cements Co., Sharpsburg, Pa.
Sherwin-Williams Co., Cleveland.
Technical Coatings, Inc., Brooklyn, N. Y.
Thompson & Co., Pittsburgh, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
Wailes Dove-Hermiston Corp., New York City.
Westinghouse Electric & Manufacturing Co., East Pittsburgh.
Wilhelm Co., A., Reading Pa.

PAINT, ROOFING

Acme Refining Co., Cleveland, O.
Acorn Refining Co., Cleveland.
Asphalt Products Co., Syracuse, N. Y.
Barber Asphalt Corp., Barber, N. J.
Barber Co., Inc., Philadelphia, Pa. (Asphalt)
Barrett Co., New York City. (Pitch)
Bird & Son, Inc., East Walpole, Mass.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Co., Philip, Lockland, Cincinnati, O.
Carter Paint Co., Liberty, Ind.
Certain-teed Products Corp., New York City.
Clinton Metallic Paint Co., Clinton, N. Y. (Red Metallic and Venetian)
Connors Paint Mfg. Co., Wm., Troy, N. Y.
Continental Products Co., Euclid, Ohio. (All kinds)
Debevoise Co., Brooklyn, N. Y.
Flintkote Co., New York City.
Ford Roofing Products Company, Chicago.
Glidden Co., Cleveland, O.
Hague & Co., Inc., Alfred, Brooklyn, N. Y.
Heath & Milligan Mfg. Co., Div. of Glidden Co., Chicago, Ill.
Hetzel Roofing Products Co., Newark, N. J.
Horn Co., A. C., Long Island City, N. Y.
Inter-Coastal Paint Co., East St. Louis, Ill.
Iowa Paint Mfg. Co., Des Moines, Ia. (Asphalt)
Klee Co., Geo. B., Cincinnati.
Koppers Co., Pittsburgh, Pa. (Bituminous)
Krehbiel Co., J. H., Chicago.
Lastik Products Co., Inc., Pittsburgh, Pa. (Asphalt, Tar)
Metropolitan Refining Co., Long Island City, N. Y.
National Mfg. Corp., Tonawanda, N. Y.
Ohmlac Paint & Refining Co., Chicago, Ill. (Asphalt)
Pecora Paint Co., Philadelphia, Pa.
Pyrolite Products Co., Cleveland, O.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh.
Ruberoid Co., New York City.
Rutland Fire Clay Co., Rutland, Vt. (Asphalt)
Sauereisen Cements Co., Pittsburgh.
Sherwin-Williams Co., Cleveland.
Thompson & Co., Pittsburgh, Pa.
Tamms Silica Co., Chicago, Ill.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit.
Wailes Dove-Hermiston Corp., New York City.
Wilhelm Co., A., Reading Pa.

PAINT SPRAY GUNS

See Guns, Spray, Paint

PAPER, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago.
Barber Asphalt Corp., Barber, N. J.
Carey Co., Philip, Lockland, Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Johns-Manville New York City.
Keasbey & Mattison Co., Ambler, Pa.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ruberoid Co., New York City.
Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
United States Gypsum Co., Chicago.
●Wilson, Inc., Grant, Chicago, Ill.

PASTE, ASBESTOS PAPER

Acme Asbestos Covering & Flooring Co., Chicago.
Clark Stek-O Corp., Rochester, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Ruberoid Co., New York City.
Rutland Fire Clay Co., Rutland, Vt.
Sall Mountain Co., Chicago, Ill.
Smith & Kanzler, Inc., Elizabeth, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
●Wilson, Inc., Grant, Chicago, Ill.

PERFORATED METAL

See Metals, Perforated, Sheet and Plate

PILLOW BLOCKS

See Bearings, Pillow Block

PIPE, CONDUCTOR

Ames Co., W. R., San Francisco, Cal.
Barnes Metal Products Co., Chicago, Ill.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
●Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Downs-Smith Brass & Copper Co., New York City.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Reeves Steel & Mfg. Co., Dover, O.
Revere Copper and Brass Incorporated, New York City.
Schoedinger Co., F. O., Columbus, O.
Sheet Metal Products Co., Peoria, Ill.
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va.
Williams-Wallace Co., San Francisco.
Woolwine Metal Products Co., Los Angeles, Cal.
York Corrugating Co., York, Pa.

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PIPE, FURNACE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Champion Furnace Pipe Co., Peoria, Ill.
●Char-Gale Mfg. Co., Minneapolis.
Chicago Furnace Supply Co., Chicago, Ill.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia, Pa.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Gray Metal Products, Inc., Rochester, N. Y.
Green Foundry & Furnace Works, Des Moines, Ia.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
●Lamneck Products, Inc., Columbus, O.
Lennox Furnace Co., Marshalltown, Ia.
Lyon, Conklin & Co., Inc., Baltimore, Md.
●Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
●Peerless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Schecter Brothers Co., Philadelphia, Pa.
Schoedinger Co., F. O., Columbus, O.
Standard Furnace & Supply Co., Omaha, Nebr.
Stratton & Terstegge Co., Louisville, Ky.
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.
Wilder Manufacturing Company, Niles, O.
●Williamson Heater Co., Cincinnati, O.
Williams-Wallace Co., San Francisco.

PIPE, SMOKE

Acer & Whedon, Inc., Medina, N. Y.
Acme Tin Plate & Roofing Supply Co., Philadelphia, Pa.
Airtherm Mfg. Co., St. Louis, Mo.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
Campbell Heating Co., Des Moines, Ia.
Champion Furnace Pipe Co., Peoria, Ill.
●Char-Gale Mfg. Co., Minneapolis.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Cincinnati Stamping Co., Cincinnati, O.
Corbman Bros., Inc., Philadelphia.
Detroit Safety Furnace Pipe Co., Detroit, Mich.
Edwards Furnace Co., Wellsboro, Pa.
●Excelsior Steel Furnace Co., Chicago, Ill.
Excelsior Stove & Mfg. Co., Quincy, Ill.
Galva Heater Co., Galva, Ill. (Cast Iron)
Green Foundry & Furnace Works, Des Moines, Ia.
●Henry Furnace & Foundry Co., Cleveland, O.
Home Furnace Co., Holland, Mich.
Howes Co., S. M., Charlestown, Boston, Mass.
International Heater Co., Utica, N. Y.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
●Lamneck Products, Inc., Columbus, O.
Lennox Furnace Co., Marshalltown, Ia.
Lyon, Conklin & Co., Inc., Baltimore, Md.
●Majestic Co., Huntington, Ind.
Maple City Furnace Co., Monmouth, Ill.
Marshall Furnace Co., Marshall, Mich.
Martin Metal Mfg. Co., Wichita, Kan.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Patten Co., J. V., Sycamore, Ill.
●Peerless Foundry Co., Indianapolis, Ind.
Portland Stove Foundry Co., Portland, Me.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Reeves Steel & Mfg. Co., Dover, O.
Roberts-Hamilton Co., Minneapolis, Minn.
Schecter Brothers Co., Philadelphia, Pa.
Schoedinger Co., F. O., Columbus, O.
Standard Furnace & Supply Co., Omaha, Nebr.
Sterling Foundry Co., Sterling, Ill. (Cast Iron)
Ster-Na-Man Foundry Co., Springfield, Ill. (Cast Iron)
Stratton & Terstegge Co., Louisville, Ky.
Tiffin Art Metal Co., Tiffin, O.
●United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia. (Cast Iron)
Wilder Manufacturing Company, Niles, O.
●Williamson Heater Co., Cincinnati, O.
Williams-Wallace Co., San Francisco.
●Wise Furnace Co., Akron, O.

PIPE & FITTINGS, GAS VENT AND FLUE

●Char-Gale Mfg. Co., Minneapolis. (blue and galvanized)
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Condensation Engineering Corp., Chicago.
Johns-Manville, New York City.
●Osborn Co., J. M. & L. A., Cleveland.
●Payne Furnace & Supply Co., Beverly Hills, Cal. (Insulated Aluminum)
Waverly Heating Supply Co., Boston. (Black, Galvanized, Chrome)
Wilder Manufacturing Co., Niles, Ohio.
Williams-Wallace Co., San Francisco.

PIPE AND FITTINGS, SHEET METAL

See Ducts and Fittings, Prefabricated

PLATE, BEARING, STUDDING SPACE

Adjustable Bearing Plate Co., St. Louis, Mo.

PLATES, ALLOY

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Aluminum Company of America, Pittsburgh, Pa.
●American Brass Co., Waterbury, Conn. (Copper)
●American Rolling Mill Co., Middletown, O.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
●Carnegie-Illinois Steel Corp., Pittsburgh.
Colonial Alloys Co., Philadelphia.
Crucible Steel Co. of America, New York City.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
●Republic Steel Corp., Cleveland, O.
Revere Copper and Brass Incorporated, New York City.
Universal-Cyclops Steel Corporation, Bridgeville, Pa.
●Youngstown Sheet & Tube Co., Youngstown, O.

PLATES, STEEL

●American Rolling Mill Co., Middletown, O.
Berger Mfg. Div. Republic Steel Co., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.
Inland Steel Co., Chicago, Ill.
International Steel Co., Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
Otis Steel Co., Cleveland, O.
●Republic Steel Corp., Cleveland.
●Ryerson & Son, Inc., Jos. T., Chicago, Ill.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.
●Youngstown Sheet & Tube Co., Youngstown, O.

PLATES, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PREFABRICATED DUCTS

See Ducts and Fittings, Prefabricated

PRESSES AND DIES

Bath & Company, Cyril, Cleveland.
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
●Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
●Dreis & Krump Mfg. Co., Chicago, Ill.
Grand Rapids Die & Tool Co., Grand Rapids, Mich.
Henry & Wright Mfg. Co., Hartford, Conn.
●Marshalltown Mfg. Co., Marshalltown, Ia.
Minster Machine Co., Minster, O.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Schatz Mfg. Co., Poughkeepsie, N. Y.

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Service Machine Co., Elizabeth, N. J.
Spun Steel Corp., Canton, O.
Verson Allsteel Press Co., Chicago.
Zeh & Hahnemann Co., Newark, N. J.

PROTECTORS, DOWNSPOUT

See Fittings and Accessories, Conductor

PSYCHROMETERS, SLING AND HAND-ASPIRATED

Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Friez & Sons, Julien P., Baltimore.
G. M. Manufacturing Co., New York City.
H-B Instrument Co., Inc., Philadelphia, Pa.
Hill Co., Chicago, Ill.
Johnson Service Co., Milwaukee.
Moeller Instrument Co., Brooklyn, N. Y.
Palmer Co., Norwood, Cincinnati, O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

PULLEYS, FAN AND MOTOR

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago.
Chicago Die Casting Co., Chicago, Ill.
●Congress Tool & Die Co., Detroit, Mich.
Dayton Rubber Mfg. Co., Dayton, Ohio.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Duro Metal Products Co., Chicago, Ill.
Goldens' Fdry. & Mach. Co., Columbus, Ga.
Horton Mfg. Co., Minneapolis, Minn.
Jones Fdry. & Mach. Co., W. A., Chicago, Ill.
●Lau Blower Co., Dayton, O.
Linderme Machine & Tool Co., Inc., Detroit.
●Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
Moloch Fdry. & Mach. Co., Kaukauna, Wis.
Pyott Fdry. & Mach. Co., Chicago, Ill.
Reynolds Mfg. Co., Grand Rapids, Mich.
Rockwood Mfg. Co., Indianapolis, Ind.
●St. Louis Tool Co., St. Louis.
Smith, Inc., Winfield, H., Springfield, N. Y.
Spun Steel Corp., Canton, O.
Swift Mfg. Co., Detroit, Mich.
Wood's Sons Co., T. B., Chambersburg, Pa.

PULLEYS, FURNACE CHAIN

●Hart & Cooley Mfg. Co., Chicago, Ill.
Medart Co., St. Louis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Stover Mfg. & Engine Co., Freeport, Ill.
●United States Register Co., Battle Creek, Mich.

PUMPS, DEEP-WELL

American-Marsh Pumps, Inc., Battle Creek, Mich.
Caldwell, Farley M., Fort Wayne, Ind.
●Chandler Co., Cedar Rapids, Ia.
Cook, Inc., A. D., Lawrenceburg, Ind.
Crane Co., Chicago, Ill.
Dayton Pump & Mfg. Co., Dayton, O.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Deming Co., Salem, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
●Heil Co., Milwaukee, Wis.
Layne & Bowler, Inc., Memphis, Tenn.
Meier Electric & Machine Co., Indianapolis, Ind.
Micro-Westco, Inc., Bettendorf, Ia.
Myers & Bro. Co., F. E., Ashland, O.
Peerless Pump Div., Food Machinery Co., Massillon, O.
Pomona Pump Co., Pomona, Cal.
Red Jacket Mfg. Co., Davenport, Ia.
Roper Corp., Geo. D., Rockford, Ill.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
United Motors Service, Detroit, Mich.
Victor Equipment Co., Los Angeles, Cal.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, SHALLOW-WELL

American-Marsh Pumps, Inc., Battle Creek, Mich.
●Chandler Co., Cedar Rapids, Ia.
Chicago Pump Co., Chicago.
Cook, Inc., A. D., Lawrenceburg, Ind.
Crane Co., Chicago, Ill.
Dayton Pump & Mfg. Co., Dayton, O.
Decatur Pump Co., Decatur, Ill.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Deming Co., Salem, O.
Fairbanks, Morse & Co., Chicago, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
●Heil Co., Milwaukee, Wis.
Layne & Bowler, Inc., Memphis, Tenn.
Lewis & Co., Inc., Chas. S., St. Louis.
Meier Electric & Machine Co., Indianapolis, Ind.
Micro-Westco, Inc., Bettendorf, Ia.
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., Ashland, Ohio.
Pomona Pump Co., Pomona, Cal.
Red Jacket Mfg. Co., Davenport, Ia.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Uniflow Mfg. Co., Erie, Pa.
United Motors Service, Detroit, Mich.
Victor Equipment Co., Los Angeles, Cal.
Viking Pump Co., Cedar Falls, Ia.
Worthington Pump & Machinery Corp., Harrison, N. J.

PUMPS, WATER CIRCULATING

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Buffalo Pumps, Inc., Buffalo, N. Y.
Chicago Pump Co., Chicago, Ill.
Decatur Pump Co., Decatur, Ill.
Deming Co., Salem, O.
De Laval Steam Turbine Co., Trenton, N. J.
Economy Pumps, Inc., Chicago.
Fairbanks, Morse & Co., Chicago, Ill.
●Frederick Iron & Steel Co., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Hammett Manufacturing Co., Kansas City, Mo.
Imperial Brass Mfg. Co., Chicago.
Ingersoll-Rand, New York City.
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Micro-Westco, Inc., Bettendorf, Ia.
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Palmer Electric Co., Detroit, Mich.
Pernot & Rich, Inc., Los Angeles.
Quimby Pump Co., Inc., Newark, N. J.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, Ohio.
Rock River Machine Co., Inc., Janesville, Wis.
Roots-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Swaby Mfg. Co., Chicago, Ill.
Trane Co., LaCrosse, Wis.
Trimount Rotary Power Co., East Dedham, Mass.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Utility Fan Corporation, Los Angeles.
Victor Equipment Co., Los Angeles, Cal.
Viking Pump Co., Cedar Falls, Ia.
Weil Pump Co., Chicago, Ill.
Weinman Pump Co., Columbus, O.
Worthington Pump & Machinery Corp., Harrison, N. J.
Yeomans Bros. Co., Chicago, Ill.

PUNCHES AND SHEARS COMBINED, LEVER OPERATED

Armstrong-Blum Mfg. Co., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G.D.S. Machinery & Supply Co., New York City.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
National Machine Tool Co., Racine, Wis.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Rock River Machine Co., Inc., Janesville, Wis.
Royersford Foundry & Machine Co., Royersford, Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Weiss & Co., H., New York City.

PUNCHES, BENCH

Armstrong-Blum Mfg. Co., Chicago, Ill.
Buffalo Forge Co., Buffalo, N. Y.

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Champion Blower & Forge Co., Lancaster, Pa.
Clough, A. W., Meriden, Conn.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Verson Allsteel Press Co., Chicago.
Weiss & Co., H., New York City.
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia.

PUNCHES, COMBINATION HAND AND BENCH

Armstrong-Blum Mfg. Co., Chicago, Ill.
Champion Blower & Forge Co., Lancaster, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
●Niagara Machine & Tool Works, Buffalo, N. Y.
●Parker-Kalon Corp., New York City.
Peck, Stow & Wilcox Co., Southington, Conn.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Weiss & Co., H., New York City.
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.

PUNCHES, HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bertsch & Co., Cambridge City, Ind.
Bollaert M., Oakland, Cal.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Cleveland Punch & Shear Works Co., Cleveland, O.
Clough, A. W., Meriden, Conn.
●Crescent Tool Co., Jamestown, N. Y.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Johnson, Inc., William, Newark, N. J.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Maplewood Machinery Co., Inc., Chicago.
●Niagara Machine & Tool Works, Buffalo, N. Y.
●Parker-Kalon Corp., New York City.
Peck Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Rock River Machine Co., Inc., Janesville, Wis.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
Weiss & Co., H., New York City.
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia.

PUNCHES, POWER

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bliss Co., E. W., Toledo, O.
Buffalo Forge Co., Buffalo, N. Y.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Cleveland Punch & Shear Works Co., Cleveland, O.
Excelsior Tool and Machine Co., East St. Louis, Ill.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright Mfg. Co., Hartford, Conn.
New Albany Machine Mfg. Co., New Albany, Ind.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Perkins Machine Co., Warren, Mass.
Rock River Machine Co., Inc., Janesville, Wis.
Royersford Foundry & Machine Co., Royersford, Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Service Machine Co., Elizabeth, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Verson Allsteel Press Co., Chicago.
Weiss & Co., H., New York City.
●Whitney Metal Tool Co., Rockford, Ill.
Wiedemann Machine Co., Philadelphia.
Zeh & Hahnemann Co., Newark, N. J.

QUADRANTS, DAMPER

See Regulators, Damper Sets

RECORDERS, HUMIDITY, PORTABLE

Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore, Md.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

RECORDERS, TEMPERATURE, PORTABLE

Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia, Pa.
Defender Automatic Regulator Co., St. Louis.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore, Md.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, New York City.
Practical Instrument Co., Chicago, Ill.

REFRACTORIES

Chapman Clay Co., Zanesville, O.
Chicago Fire Brick Co., Chicago, Ill.
Cleveland Fire Brick Co., Cleveland, O.
Fireline Stove & Furnace Lining Co., Chicago.
Gilbert & Son, Harry E., Bridgeport, Conn. (Radiant)
Johns-Manville, New York City. (Cement and monolithic)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Clay Products Co., St. Louis, Mo. (Fire brick and high temperature mortars)
●McLeod & Henry Co., Inc., Troy, N. Y.
Munn and Steele, Inc., Newark, N. J.
Plibrico Jointless Firebrick Co., Chicago. (Plastic fire brick for stokers and oil burners)
Preferred Utilities Mfg. Corp., New York City.
Pyrolite Products Co., Cleveland, O.
Refractory & Insulation Corp., New York City.
Rex Clay Products Co., Detroit, Mich.
Ruberoid Co., New York City.
Schundler & Co., Inc., F. E., Joliet, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Walsh Refractories Corp., St. Louis, Mo.

REGISTER SHIELDS

See Shields, Warm Air Register

REFRIGERATING UNITS

See Compressors, Refrigerating

REGISTERS, DIRECTIONAL FLOW

●Air Control Products, Inc., Muskegon, Mich.
●Auer Register Co., Cleveland, O.
●Barber-Colman Co., Rockford, Ill.
●Char-Gale Mfg. Co., Minneapolis.
Eckenroth Register Co., San Francisco, Cal.
Elsey Metal Specialties Co., Detroit, Mich.
Gillian Mfg. Co., Detroit.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
●Independent Register Co., Cleveland, O.
Kauffman Air Conditioning Corp., St. Louis.
Middleton Mfg. & Sales Co., Minneapolis.
●Register & Grille Mfg. Co., Brooklyn, N. Y.
●Standard Stamping & Perforating Co., Chicago.
●Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia.

REGISTERS, HEATING AND VENTILATING

●Air Control Products, Inc., Muskegon, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
●Auer Register Co., Cleveland, O.
●Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Eckenroth Register Co., San Francisco, Cal.
Gillian Mfg. Co., Detroit.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hendrick Mfg. Co., Carbondale, Pa.
●Independent Register Co., Cleveland, O.
Kauffman Air Conditioning Corp., St. Louis.
●Lamneck Products, Inc., Columbus, O.
Middleton Mfg. & Sales Co., Minneapolis.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Newman Brothers, Inc., Cincinnati, O.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Roberts-Hamilton Co., Minneapolis, Minn.
●Rock Island Register Co., Rock Island, Ill.
●Standard Stamping & Perforating Co., Chicago.
●Tuttle & Bailey, Inc., New Britain, Conn.

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●United States Register Co., Battle Creek, Mich.
Waterloo Register Co., Waterloo, Ia.

REGULATORS, DAMPER SETS

Adams Company, The, Dubuque, Ia.
●Air Control Products, Inc., Muskegon, Mich.
California Cornice, Steel and Supply Corp., Los Angeles. Cal.
●Gerett Co., M. A., Milwaukee.
●Goese Mfg. Co., Milwaukee, Wis.
●Hart & Cooley Mfg. Co., Chicago.
●Joal Mfg. Corp., Toledo.
Kerentoff, G. L., Cincinnati.
●Ohio Products Co., Cleveland.
●Parker-Kalon Corp., New York City.
●United States Register Company, Battle Creek, Mich.
Young Regulator Co., Cleveland.

REGULATORS, DRAFT, SMOKE PIPE

Atlas Valve Company, Newark, N. J.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Cole-Sullivan Engineering Co., Minneapolis, Minn.
Defender Automatic Regulator Co., St. Louis.
Field Mfg. Co., Chicago, Ill.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Gold Seal Furnace Co., Minneapolis, Minn. (Automatic)
Harvey-Whipple, Inc., Springfield, Mass.
Hoffman Thermal Sales Co., Ann Arbor, Mich.
Hotstream Heater Co., Cleveland, O. (Automatic)
James Regulator Co., Inc., Pottsville, Pa.
●Mercoid Corp., Chicago.
Piatt Products Corp., Lansing, Mich. (6 and 9-inch)
Polk Mfg. Co., Madison, Wis.
Preferred Utilities Mfg. Corp., New York City.
Simplex Mfg. Co., Fond du Lac, Wis.
Walker Mfg. & Sales Corp., St. Joseph, Mo.
Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

REGULATORS, FURNACE DRAFT, MECHANICAL

Au-Temp-Co Corp., New York City.
●Automatic Humidifier Co., Cedar Falls, Ia.
●Barber-Colman Co., Rockford, Ill.
Cole-Sullivan Engineering Co., Minneapolis, Minn.
Defender Automatic Regulator Co., St. Louis.
●Gleason-Avery, Inc., Auburn, N. Y.
Gold Seal Furnace Co., Minneapolis, Minn.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hays Corp., Michigan City, Ind.
Little Janitor Furnace Clock Co., New York City.
●Mercoid Corp., Chicago, Ill.
Minneapolis Automatic Draft Regulator Co., Minneapolis, Minn.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Russell Electric Co., Chicago, Ill.
Tem Products Co., Midland, Pa.
Uni-Therm Products Co., Elyria, O.
Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

RELAYS, ELECTRICAL

Advance Electric Co., Los Angeles, Cal.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Au-Temp-Co Corp., New York City.
Automatic Products Co., Milwaukee.
Automatic Switch Co., New York City.
Automatic Temperature Control Co., Inc., Philadelphia.
Bell & Gossett Co., Chicago.
Bender Warrick Corp., Birmingham, Mich.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
●Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
●Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia, Pa.
Edison Electric Controls Div., Thos. A. Edison, Inc., West Orange, N. J.
Electric Controller & Mfg. Co., Cleveland, O.
Friez & Sons, Julien P., Baltimore, Md.
●General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
●Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Inc., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
McCorkle Co., D. H., Berkeley, Cal.
●Magnet Switch Co., Chicago.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., Baltimore, Md.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Russell Electric Company, Chicago.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Square D Co., Detroit.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
●White Manufacturing Co., St. Paul.
●White-Rodgers Electric Co., St. Louis.
Zenith Electric Co., Chicago, Ill.

REPAIRS, STOVE AND FURNACE

Adams Company, The, Dubuque, Ia.
Associated Heater Parts Co., Chicago, Ill.
Banner Repair Parts Co., Youngstown, O.
●Brauer Supply Co., A. G., St. Louis, Mo.
●Capitol Furnace & Stove Repair Co., Indianapolis, Ind.
●Central Furnace & Stove Repair Co., St. Louis, Mo.
Cincinnati Stamping Co., Cincinnati, O.
Des Moines Stove Repair Co., Des Moines, Ia.
Edwards Furnace Co., Wellsboro, Pa.
Eselgroth & Co., Newark, N. J.
●Faultless Heater Corp., Cleveland, O.
Metzner Stove Repair Co., Kansas City, Mo.
Miller & Son, C. Arthur, Elmira, N. Y. (Furnace)
National Foundry & Furnace Co., Dayton, O.
●Northwestern Stove Repair Co., Chicago, Ill.
Omaha Stove Repair Works, Omaha, Neb.
●Peerless Foundry Co., Indianapolis, Ind.
●Peninsular Stove Co., Detroit, Mich.
Pittsburgh Furnace Parts Co., Pittsburgh, Pa.
Portland Stove Foundry Co., Portland, Me.
●Shamblen Furnace Parts Co., Pittsburgh, Pa.
Stiglitz Furnace & Foundry Co., Louisville, Ky.
Wayne Pattern & Foundry Co., Fort Wayne, Ind.

RIDGE ROLLS AND RIDGING (METAL)

●American Rolling Mill Co., Middletown, O.
Ames Co., W. R., San Francisco, Cal.
Barnes Metal Products Co., Chicago, Ill.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
●Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Gulf States Steel Co., Birmingham, Ala.
●Hussey & Co., C. G., Pittsburgh, Pa. (Copper)
Klauer Mfg. Co., Dubuque, Ia.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lamb & Ritchie Co., Cambridge, Mass.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland, O.
Reeves Steel & Mfg. Co., Dover, O.
●Republic Steel Corp., Cleveland, O.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Southern States Iron Roofing Co., Savannah, Ga.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, O.
Van Noorden Co., E., Boston, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
Williams-Wallace Co., San Francisco, Cal.
Woolwine Metal Products Co., Los Angeles, Cal.
●Youngstown Sheet & Tube Co., Youngstown, O.

RIVETS, ALLOY

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Clark Bros. Bolt Co., Millidale, Conn.
National Screw & Mfg. Co., Cleveland.
●Republic Steel Corp., Cleveland, O.
Townsend Co., New Brighton, Pa.
●Tubular Rivet & Stud Co., Wollaston, Mass.

RIVETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Bridgeport Screw Co., Bridgeport, Conn.
Chicago Rivet & Machine Co., Cicero, Ill.
Continental Screw Co., New Bedford, Mass.
Hassall, Inc., John, Brooklyn, N. Y.
Townsend Co., New Brighton, Pa.
●Tubular Rivet & Stud Co., Wollaston, Mass.

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RIVETS, BRASS, COPPER AND IRON

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Bethlehem Steel Co., Bethlehem, Pa.
Blake & Johnson Co., Waterville, Conn.
Bridgeport Screw Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Rivet & Machine Co., Cicero, Ill.
Continental Screw Co., New Bedford, Mass.
Downs-Smith Brass & Copper Co., New York City.
Hassall, Inc., John, Brooklyn, N. Y.
●Hussey & Co., C. G., Pittsburgh, Pa.
National Screw & Mfg. Co., Cleveland, O.
Townsend Co., New Brighton, Pa.
●Tubular Rivet & Stud Co., Wollaston, Mass.

RIVETS, STEEL

Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Atlas Bolt & Screw Co., Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Chicago Rivet & Machine Co., Cicero, Ill.
Clark Bros. Bolt Co., Millidale, Conn.
Inland Steel Co., Chicago, Ill.
National Screw & Mfg. Co., Cleveland.
●Republic Steel Corporation, Cleveland.
Townsend Co., New Brighton, Pa.
●Tubular Rivet & Stud Co., Wollaston, Mass.

ROD, GAS WELDING

Air Reduction Sales Co., New York City.
American Agile Corporation, Cleveland.
●American Brass Co., Waterbury, Conn.
American Steel & Wire Co., Chicago, Ill.
Bastian Blessing Co., Chicago.
Bridgeport Brass Co., Bridgeport, Conn.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Crucible Steel Co. of America, New York City.
Duraloy Co., Scottdale, Pa.
Handy & Harmon, New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
●International Nickel Co., Inc., New York City. (Monel)
Linde Air Products Co., The, New York City.
Maurath, Inc., Cleveland, O.
Milburn Co., Alexander, Baltimore, Md.
Page Steel & Wire Div., Monessen, Pa. (Stainless Steel)
●Republic Steel Corporation, Cleveland.
Revere Copper and Brass Incorporated, New York City.
Roebling's Sons Co., John A., Trenton, N. J.
Seneca Wire & Mfg. Co., Fostoria, Ohio.
Sight Feed Generator Co., Richmond, Ind.
Torchweld Equipment Co., Chicago, Ill.
Una Welding, Inc., Cleveland, O.
Universal Power Corp., Cleveland.
Walworth Co., New York City.
●Youngstown Sheet & Tube Co., Youngstown, O.

ROOFING, ALUMINUM

Air-O-Cel Industries, Inc., Detroit.
Certain-teed Products Corporation, New York City.
Fingles, Inc., W. A., Baltimore, Md.

ROOFING, BUILT-UP

Air-O-Cel Industries, Inc., Detroit.
●American Brass Co., Waterbury, Conn. (Thin copper)
Barber Asphalt Corp., Barber, N. J.
Barber Co., Inc., Philadelphia, Pa.
Barrett Co., New York City.
Bird & Son, Inc., East Walpole, Mass.
Cabot, Inc., Samuel, Boston, Mass.
Carey Co., Philip, Lockland, Cincinnati, O.
Certain-teed Products Corp., New York City.
Detroit Steel Products Co., Detroit.
Flintkote Co., New York City.
Ford Roofing Products Co., Chicago.
Johns-Manville, New York City.
Koppers Co., Pittsburgh. (Pitch and Felt)
Logan-Long Co., Chicago, Ill.
National Mfg. Corp., Towananda, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Robertson Co., H. H., Pittsburgh, Pa.
Ruberoid Co., New York City.
United States Gypsum Co., Chicago, Ill.

ROOFING, COPPER

●American Brass Co., Waterbury, Conn.
Berger Mfg. Div. Republic Steel Corp., Canton, O.
Braden Mfg. Co., Terre Haute, Ind.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Copper Roofs Corp., Milwaukee.
Downs-Smith Brass & Copper Co., New York City.
Edwards Mfg. Co., Inc., Cincinnati, O.
Fingles, Inc., W. A., Baltimore, Md.
●Hussey & Co., C. G., Pittsburgh, Pa.
Klauer Manufacturing Co., Dubuque, Ia.
●Milcor Steel Co., Milwaukee, Wis.
National Brass & Copper Co., Inc., Pittsburgh, Pa.
New Haven Copper Co., Seymour, Conn.
Revere Copper and Brass Incorporated, New York City.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

ROOFING, IRON

●American Rolling Mill Co., Middletown, O.
Ames Co., W. R., San Francisco, Cal.
Berger Mfg. Div. Republic Steel Corp., Canton, O.
Byers Co., A. M., Pittsburgh, Pa.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
International Steel Company, Evansville, Ind.
Martin Metal Mfg. Co., Wichita, Kan.
Newport Rolling Mill Co., Newport, Ky.
●Republic Steel Corp., Cleveland, O.
Southern States Iron Roofing Co., Savannah, Ga.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, O.

ROOFING, LEAD

Alpha Metal & Rolling Mills, Inc., Brooklyn.
Andrews Lead Co., Inc., Long Island City.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Eagle-Picher Lead Co., Cincinnati, Ohio.
Fingles, Inc., W. A., Baltimore, Md.
Flemm Lead Co., Inc., Long Island City.
National Lead Co., New York City.
Rochester Lead Works, Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

ROOFING, SLATE

Chapman Slate Co., Bethlehem, Pa.
Flemm Lead Company, Inc., Long Island City, N. Y.
Jackson-Bangor Slate Co., Pen Argyl, Pa.
North Bangor Slate Co., Bangor, Pa.
Rising & Nelson Slate Co., West Pawlet, Vt.
Sheldon Slate Products Co., Granville, N. Y.
Structural Slate Co., Pen Argyl, Pa.
Vendor Slate Co., Inc., Nazareth, Pa.
Vermont Structural Slate Co., Fair Haven, Vt.

ROOFING, STEEL

Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Stainless)
●American Rolling Mill Co., Middletown, Ohio.
Ames Co., W. R., San Francisco.
Apollo Steel Company, Apollo, Pa.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
Braden Mfg. Co., Terre Haute, Ind.
Budke Stamping Co., Canonsburg, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
●Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Products Co., Detroit.
Edwards Manufacturing Co., Inc., Cincinnati.
Inland Steel Co., Chicago.
International Steel Company, Evansville, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.
Klauer Manufacturing Co., Dubuque, Ia.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee.
Newport Rolling Mill Co., Newport, Ky.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reeves Steel & Mfg. Co., Dover, Ohio.
●Republic Steel Corp., Cleveland.
Robertson Co., H. H., Pittsburgh.
Southern States Iron Roofing Co., Savannah, Ga.
●Superior Sheet Steel Co. Div. Continental Steel Corp., Canton, O.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Tiffin Art Metal Co., Tiffin, Ohio.
Truscon Steel Co., Youngstown, Ohio.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Wheeling Steel Corporation, Wheeling, W. Va.
●Youngstown Sheet & Tube Co., Youngstown, Ohio.

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ROOFING, TERNE PLATE

Berger Mfg. Div., Republic Steel Corp., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, Ohio.
Edwards Mfg. Co., Inc., Cincinnati.
Follansbee Bros. Co., Pittsburgh.
Klauer Manufacturing Co., Dubuque, Ia.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee.
●Republic Steel Corp., Cleveland.
Tiffin Art Metal Co., Tiffin, Ohio.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
●Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROOFING, TILE (CLAY & CONCRETE)

Hood Co., B. Mifflin, Daisy, Tenn. (Clay)
Ludowici-Celadon Co., Chicago, Ill.
Murray Tile Co., Cloverport, Ky.
National Fireproofing Corp., Pittsburgh.
Truscon Laboratories, Detroit.
United States Gypsum Co., Chicago.

ROOFING, TIN

Berger Mfg. Div. of Republic Steel Corp., Canton, O.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Edwards Mfg. Co., Inc., Cincinnati.
Follansbee Bros. Co., Pittsburgh, Pa.
Klauer Manufacturing Co., Dubuque, Ia.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
●Republic Steel Corporation, Cleveland.
Southern States Iron Rfg. Co., Savannah, Ga.
Taylor Co., N. & G., Div. Republic Steel Co., Cumberland, Md.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.

ROOFING, ZINC

American Zinc Products Co., Greencastle, Ind.
Barnes Metal Products Co., Chicago, Ill.
Edwards Mfg. Co., Inc., Cincinnati.
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York City.
Southern States Iron Rfg. Co., Savannah, Ga.
Wheeling Corrugating Co., Wheeling, W. Va. (Coated)
Wheeling Steel Corp., Wheeling, W. Va. (Coated)

SAVERS, HEAT

Air-n-Oil Burners and Heating Utilities, Inc., Brooklyn, N. Y.
Barclay, Inc., Robert, Chicago.
Bedard Mfg. Co., Minneapolis, Minn. (Smoke Pipe)
Carey Mfg. Co., Waupaca, Wis.
Chinook, Inc., St. Paul, Minn.
Condensation Engineering Corp., Chicago, Ill.
Crown Fuel Saver Co., Richmond, Ind.
Gerhardt, W. F., Richmond, Va.
Harvey-Whipple, Inc., Springfield, Mass.
Industrial Sheet Metal Works, Inc., Detroit.
Roberts-Hamilton Co., Minneapolis, Minn.
Wolff Coal Saver Co., Chicago, Ill.
Woolery Machine Co., Minneapolis, Minn.

SAWS, BAND, SHEET METAL CUTTING

Atkins & Co., E. C., Indianapolis, Ind.
Barnes, W. O., Detroit.
Continental Machine Specialties, Inc., Minneapolis. (Rotary)
Grob Brothers, Grafton, Wis.
Disston & Sons, Inc., Henry, Tacony Sta., Philadelphia.
Tannewitz Works, Grand Rapids, Mich.
Wells Mfg. Corp., Three Rivers, Mich.

SCREENS, SOLAR HEAT RESISTING

Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

SCREWS, DRIVE

American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corp., New Britain, Conn.
Deniston Co., Chicago, Ill.
Hassall, Inc., John, Brooklyn, N. Y.
National Lock Co., Rockford, Ill.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City. (Hardened Metallic)
Townsend Co., New Brighton, Pa.
Turner & Seymour Mfg. Co., Torrington, Conn.

SCREWS, SELF-TAPPING

American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corporation, New Britain, Conn.
National Lock Co., Rockford, Ill.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City.
Shakeproof Lock Washer Co., Chicago, Ill.
●United States Register Co., Battle Creek, Mich.

SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)
American Screw Co., Providence, R. I.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y. (Stainless Steel)
Continental Screw Co., New Bedford, Mass.
Corbin Screw Corporation, New Britain, Conn.
National Lock Co., Rockford, Ill.
National Screw & Mfg. Co., Cleveland, O.
●Parker-Kalon Corp., New York City.
Townsend Co., New Brighton, Pa.
●United States Register Co., Battle Creek, Mich.

SHEARS, CIRCLE, HAND

●Crescent Tool Co., Jamestown, N. Y.
●Niagara Machine & Tool Works, Buffalo.
Quickwork Co., Chicago.
Peck, Stow & Wilcox Co., Southington, Conn.
●Wiss & Sons Co., J., Newark, N. J.

SHEARS, HAND AND BENCH

See Snips and Shears, Bench and Hand

SHEARS AND PUNCHES COMBINED

See Punches and Shears Combined

SHEARS, ELECTRIC, PORTABLE

Black & Decker Mfg. Co., Towson, Md.
G. D. S. Machinery & Supply Co., New York City.
Independent Pneumatic Tool Co., Chicago.
Skilsaw, Inc., Chicago.
Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.
Van Dorn Electric Tool Co., Towson, Md.

SHEARS, ROTARY, SLITTING, HAND

●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Co., Chicago.
Rafter Machine Co., Belleville, N. J.
Wagner, C. DeWitt, Cedar Rapids, Iowa.

SHEARS, SQUARING, FOOT

Bertsch & Co., Cambridge City, Ind.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Royersford Foundry & Machine Co., Royersford, Pa.

SHEARS, SQUARING, POWER

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Bliss & Co., E. W., Toledo, Ohio.
Buffalo Forge Co., Buffalo, N. Y.
●Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland.
Excelsior Tool and Machine Co., East St. Louis, Ill.
●Niagara Machine & Tool Works, Buffalo.
Peck, Stow & Wilcox Co., Southington, Conn.
Pels & Co., Inc., Henry, New York City.
Rock River Machine Co., Inc., Janesville, Wis.
●Whitney Metal Tool Company, Rockford, Ill.

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SHEET METAL PARTS

See Mouldings and Trim; also Stampings, Metal.

SHEETS, ALUMINUM

Aluminum Company of America, Pittsburgh, Pa.
American Nickeloid Company, Peru, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Brackenridge, Pa. (Stainless)
Aluminum Company of America, Pittsburgh.
Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago.
●International Nickel Co., Inc., New York City. (Nickel Clad)
Jessop Steel Co., Washington, Pa.
Lukens Steel Co., Coatesville, Pa.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

SHEETS, COPPER

●American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
●Hussey & Co., C. G., Pittsburgh, Pa.
National Brass & Copper Co., Inc., Pittsburgh, Pa.
New Haven Copper Co., Seymour, Conn.
Revere Copper and Brass Incorporated, New York City.
●Scovill Mfg. Co. Morency-Van Buren Div., Sturgis, Mich.
U. S. Brass & Copper Co., Hyde Park, Mass.

SHEETS, COPPER, LEAD COATED

●American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Downs-Smith Brass & Copper Co., New York City.
●Hussey & Co., C. G., Pittsburgh, Pa.
Ledkote Products Co., Long Island City, N. Y.
National Brass & Copper Co., Inc., Lisbon, O.
New Haven Copper Co., Seymour, Conn.
Revere Copper & Brass Incorporated, New York City.
U. S. Brass & Copper Co., Hyde Park, Mass.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

SHEETS, GALVANNEALED

Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Continental Steel Corp., Kokomo, Ind.
Granite City Steel Co., Granite City, Ill.
Newport Rolling Mill Co., Newport, Ky.
●Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
●Superior Sheet Steel Co., Canton, O.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
●Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, LEAD

Alpha Metal & Rolling Mills, Inc., Brooklyn.
Andrews Lead Co., Inc., Long Island City, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Eagle-Picher Lead Co., Cincinnati, O.
Flemm Lead Co., Inc., Long Island City, N. Y.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York City.
Rochester Lead Works, Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

SHEETS, MONEL

●International Nickel Company, Inc., New York City.

SHEETS, SPECIAL METAL

(Nickel Zinc, Chrome Zinc, Nickel Coated Copper, Chromium Coated Copper, Nickel Coated Steel, Chromium Coated Steel, Chromium Coated Nickel Silver, Zinc Brass, Zinc Copper, etc.)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
American Nickeloid Co., Peru, Ill.
Apollo Metal Works, Chicago. (Nickel alloy)
Chase Brass & Copper Co., Inc., Waterbury, Conn.
●Hussey & Co., C. G., Pittsburgh, Pa.
Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Lustro Coated Sheets Co., Pittsburgh, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Maysteel Products, Inc., Mayville, Wis.
National Sheet Metal Co., Peru, Ill.
●Republic Steel Corporation, Cleveland.
Revere Copper and Brass Incorporated, New York City.
Wilder Manufacturing Company, Niles, O.

SHEETS, STAINLESS

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
●American Rolling Mill Co., Middletown, Ohio.
Barium Stainless Steel Corp., Canton, O.
Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Crucible Steel Co. of America, New York City. (Two-Ply)
Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lukens Steel Company, Coatesville, Pa.
●Republic Steel Corp., Cleveland, O.
●Ryerson & Son, Inc., Jos. T., Chicago, Ill.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
Universal-Cyclops Steel Corp., Bridgeville, Pa.

SHEETS, STEEL

(Polished and Blue, Corrugated and Plain, Black, Terne and Galvanized)

Allegheny Ludlum Steel Corp., Brackenridge, Pa.
●American Rolling Mill Co., Middletown, O.
Apollo Steel Co., Apollo, Pa.
Berger Mfg. Div. of Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
●Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Crucible Steel Company of America, New York City.
Edwards Mfg. Co., Inc., Cincinnati.
Empire Sheet & Tin Plate Co., Mansfield, O.
Follansbee Brothers Co., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
Lyon, Conklin & Co., Inc., Baltimore, Md.
National Steel Corp., Pittsburgh, Pa.
Newport Rolling Mill Co., Newport, Ky.
Niles Rolling Mill Co., Niles, O.
Otis Steel Co., Cleveland, O.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reeves Steel & Mfg. Co., Dover, O.
●Republic Steel Corp., Cleveland, Ohio.
Sharon Steel Co., Sharon, Pa.
●Superior Sheet Steel Co., Canton, O. (Galvanized)
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.
●Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL COPPER BEARING

●American Rolling Mill Co., Middletown, O.
Apollo Steel Co., Apollo, Pa.
Berger Mfg. Div. Republic Steel Corp., Canton, Ohio.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
●Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind.
Follansbee Brothers Co., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Lukens Steel Co., Coatesville, Pa.
National Steel Corp., Pittsburgh.
Newport Rolling Mill Co., Newport, Ky.
Otis Steel Co ., Cleveland, O.
Reeves Mfg. Co., Dover, O.
●Republic Steel Corp., Cleveland, O.
Sharon Steel Co., Sharon, Pa.
●Superior Sheet Steel Co., Canton, O.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
●Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, TIN PLATE

Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Berger Mfg. Div. Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
●Columbia Steel Co., Sub. U. S. Steel Corp., San Francisco.
Crucible Steel Company of America, New York City.
Eagle-Picher Lead Co., Cincinnati, O.
Follansbee Brothers Co., Pittsburgh, Pa.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Tinned)
Lyon, Conklin & Co., Inc., Baltimore, Md.
●Republic Steel Corporation, Cleveland.
Rochester Lead Works, Inc., Rochester, N. Y.
Sharon Steel Corp., Sharon, Pa.

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●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Weirton Steel Co., Weirton, W. Va.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
●Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill.
American Zinc Products Co., Greencastle, Ind.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York City.

SHIELDS, WARM AIR REGISTER

Gammeter Co., W. F., Cadiz, O. (With Humidifier)
Gillian Mfg. Co., Detroit.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Patent Novelty Co., Fulton, Ill. (With Humidifier)
Pentecost & Craft Co., Terre Haute, Ind.
Schoedinger, F. O., Co., Columbus, O.

SHINGLES AND TILE, METAL

●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Columbian Enameling & Stamping Co., Terre Haute, Ind.
Fingles, Inc., W. A., Baltimore, Md.
Globe Iron Roofing & Corrugating Co., Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
New Haven Copper Co., Seymour, Conn. (Copper)
Newport Rolling Mill Co., Newport, Ky.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Reeves Steel & Mfg. Co., Dover, O.
St. Paul Corrugating Co., St. Paul, Minn.
Southern States Iron Roofing Co., Savannah, Ga.
Tiffin Art Metal Co., Tiffin, O.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.

SHUTTERS

See Louvres and Shutters

SKYLIGHTS

American Barlock Co., Inc., Long Island City, N. Y.
American Sheet Metal Works, New Orleans, La.
Anderson Mfg. Co., Des Moines, Ia.
Beatrice Steel Tank Mfg. Co., Beatrice, Nebr.
Brundage Co., Kalamazoo, Mich.
California Cornice, Steel and Supply Corp., Los Angeles, Cal.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Drouve Co., G., Fairfield, Conn.
Edwards Mfg. Co., Inc., Cincinnati, O.
Falstrom Co., Passaic, N. J.
Fingles, Inc., W. A., Baltimore, Md.
Goethel Co., Alfred C., Milwaukee, Wis.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Hudson Equipment Corp., Minneapolis, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Lee & Son Co., Thomas, Cincinnati, O.
Martin Metal Mfg. Co., Wichita, Kan.
Mesker & Co., Geo. L., Evansville, Ind.
Midwest Ventilating Works, Milwaukee, Wis.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Riester & Thesmacher Co., Cleveland.
Robertson Co., H. H., Pittsburgh, Pa.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger, F. O., Co., Columbus, O.
Southern States Iron Roofing Co., Savannah, Ga.
Van Noorden Co., E., Boston, Mass.
Vent-O-Lite Co., Chicago, Ill. (Ventilating, Industrial, Puttyless)
Ward Co., H. H., Chester, Pa.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

SKYLIGHT LIFTS

See Lifts, Skylight

SMOKE PIPE

See Pipe, Smoke

SNIPS AND SHEARS, BENCH AND HAND

Armstrong-Blum Mfg. Co., Chicago, Ill.
Bartlett Mfg. Co., Detroit, Mich.
Beverly Throatless Shear Co., Chicago, Ill.
Bremil Mfg. Co., Erie, Pa. (Shears)
Clauss Shear Co., Fremont, O.
Compton Shear Co., W. H., Newark, N. J.
●Crescent Tool Co., Jamestown, N. Y.
G. D. S. Machinery & Supply Co., New York City.
Grobet File Corp. of America, New York City.
●Klenk's Aviation Snips, Wilmington, Del.
●Marshalltown Mfg. Co., Marshalltown, Ia.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
●St. Louis Tool Co., St. Louis.
Viking Shear Co., Erie, Pa.
●Wiss & Sons Co., J., Newark, N. J.

SOLDER

Allen Co., L. B., Chicago, Ill.
Alpha Metal & Rolling Mills, Inc., Brooklyn.
●American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.
Andrews Lead Co., Inc., Long Island City, N. Y.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Incorporated, Waterbury, Conn.
Consolidated Metals Corp., Detroit, Mich.
Downs-Smith Brass & Copper Co., New York City.
Eagle-Picher Co., Cincinnati, O. (Bar and Wire)
Empire Metal Co., Syracuse, N. Y.
Flemm Lead Co., Inc., Long Island City.
Gardiner Metal Co., Chicago, Ill.
Handy & Harmon, New York City.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Co., Lloyd S., Chicago.
Johnston Tin Foil & Metal Co., St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Manufacturing Co., Dubuque, Ia.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
Lukens Metal Co., Thos. F., Philadelphia, Pa.
Merchant & Evans Co., Philadelphia, Pa.
National Lead Co., New York City.
●Ruby Chemical Co., Columbus, O. (Acid and Rosin Core)
●Ryerson & Son, Inc., Joseph T., Chicago, Ill.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

SOLDERING COPPERS

See Coppers, Soldering

SOLDERING FLUX

See Flux, Soldering

SOLDERING FURNACES

See Furnaces, Soldering

SOLDERING IRONS

See Coppers, Soldering

SOLDERING TORCHES

See Torches, Soldering

SOLENOID VALVES

See Valves, Solenoid

SOUND LEVEL INDICATORS

See Indicators, Sound Level

STAMPINGS, METAL

Ames Co., W. R., San Francisco.
Anti-Corrosive Metal Products Co., Inc., Albany, N. Y.
Bossert Company, Inc., Utica, N. Y.
Budke Stamping Co., Canonsburg, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
●Cleveland Steel Products Corp., Toridheet Div., Cleveland.
Dail Steel Products Co., Lansing, Mich.
Dayton Rogers Mfg. Co., Minneapolis, Minn.
Edwards Mfg. Co., Inc., Cincinnati.
Friedley-Voshardt Co., Chicago, Ill.
General Blower Corp., San Francisco.
General Metal Products Co., St. Louis, Mo.
Geuder, Paeschke & Frey Co., Milwaukee, Wis.
Gillian Mfg. Co., Detroit.
Globe Machine & Stamping Co., Cleveland, O.
Grammes & Sons, Inc., Allentown, Pa.
Maysteel Products, Inc., Mayville, Wis.
Metal Stamping & Mfg. Co., Cleveland.
Mullins Mfg. Co., Warren, O.
National Manufacturing & Engineering Co., Detroit.
New Monarch Machine & Stamping Co., Des Moines, Ia.
●Osborn Co., J. M. & L. A., Cleveland, O.

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●Standard Stamping & Perforating Co., Chicago, Ill.
Steel & Tubes Div. Republic Steel Corp., Cleveland.
Tannewitz Works, Grand Rapids, Mich.

STOKER CONTROLS

See Controls, Stoker

STOKERS, DOMESTIC

(Up to 61 lb. per hr.)

●Advance Appliance Co., Peoria, Ill.
Air Conditioning & Stokers, Inc., St. Louis.
Airtemp, Inc., Dayton, O.
Anchor Stove & Range Co., New Albany, Ind.
Athens Plow Co., Athens, Tenn.
Auburn Burner Co., Auburn, Ind.
Auburn Stoker Co., Auburn, Ind.
Automatic Stoker Corp., Indianapolis, Ind.
Bardes Range & Foundry Co., E. H., Cincinnati, O.
Beckley Perforating Co., Garwood, N. J. (Anthracite)
Bluffton Mfg. Co., Findlay, O.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Burnham Stoker Co., Vancouver, Wash.
Burnwell Corp., Allentown, Pa.
Butler Mfg. Co., Kansas City, Mo.
Butler Street Foundry & Iron Co., Chicago, Ill.
Carrier Corp., Syracuse, N. Y.
Chicago Automatic Stoker Co., Inc., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Comet Electric Company, Indianapolis, Ind.
Conco Corporation, Mendota, Ill.
Cornell Manufacturing Co., Indianapolis, Ind.
Cooper & Cooper, Inc., Pittsfield, Mass. (Anthracite)
Crane Co., Chicago. (Bituminous & Anthracite)
Crouch Corporation, Birmingham, Mich.
Delco Appliance Div., General Motors Sales Corp., Rochester, N. Y.
Dickson & Eddy, New York City.
Econocol Stoker Div. of Cotta Transmission Corp., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man, Inc., New York City.
Fairbanks, Morse & Co., Chicago, Ill.
Finnell Rotary Stokers, Inc., Elkhart, Ind.
Flynn and Emrich Co., Baltimore, Md.
●Frederick Iron & Steel Co., Frederick, Md.
Fuel Saver, Inc., Harrisburg, Pa.
Furnaceslave, Inc., Indianapolis, Ind.
Gehl Bros., Inc., West Bend, Wis.
General Machine Co., Inc., New York City.
General Machinery Co., Spokane, Wash.
General Stokers, Inc., Philadelphia. (Anthracite)
Germer Stove Co., Erie, Pa.
Green Foundry & Furnace Works, Des Moines, Ia.
Hall-Neal Furnace Co., Indianapolis, Ind.
Hamilton Automatic Stoker Corp., Hamilton, O.
Heating Assurance, Inc., Spokane, Wash.
Hemp Engineering & Stoker Corp., Macomb, Ill.
Heritage Stoker Sales, Inc., Chicago, Ill.
●Hess Warming and Ventilating Co., Chicago, Ill.
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Ideal Furnace Co., Detroit.
Illinois Iron & Bolt Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
Keith Furnace Co., Des Moines, Ia.
Kol-Master Corp., Oregon, Ill.
Leach Co., Oshkosh, Wis.
Liberty Coal Burner Co., St. Louis, Mo.
Link-Belt Co., Chicago, Ill.
Meier Electric & Machine Co., Indianapolis, Ind.
●Meyer Furnace Co., Peoria, Ill.
Micro-Westco, Inc., Bettendorf, Ia.
Model Mfg. Co., Richmond, Va.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Motorstokor Div. of Hershey Machine & Foundry Co., Manheim, Pa.
Muncie Gear Works, Inc., Muncie, Ind.
Murray Corporation of America, Detroit.
National Steam Pump Co., Upper Sandusky, O.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman Co., St. Louis, Mo.
Peerless Mfg. Co., Louisville, Ky.
Perfectaire Corp., Baltimore, Md.
Plymouth Industries, Inc., Plymouth, Ind.
Pocahontas Fuel Corp., Stoker Div., Cleveland.
Pulvokol, Inc., Minneapolis, Minn. (Pulverized Coal Burner)
Racine Stoker Mfg. Co., Racine, Wis.
Risdon Stoker Corp., Seattle, Wash.
Rudy Furnace Co., Dowagiac, Mich.
Schwab Furnace & Mfg. Co., Milwaukee, Wis.
Schwab Safe Co., Lafayette, Ind.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Sinker-Davis Co., Indianapolis, Ind.
Standard Stoker Corporation, New Albany, Ind.
Steel Products Engineering Co., Springfield, O.
Stok-A-Fire Co., Inc., University City, Mo.
Stokerette Mfg. Co., Chicago, Ill.
Stokermatic Co., Salt Lake City, Utah.
Stoker Products, Inc., Decatur, Ill.
Susquehanna Engineering Co., Bloomsburg, Pa.
Toledo Stoker Co., Toledo, O.
Tropic-Air Stoker Co., Canton, O.
U. S. Machine Corporation, Lebanon, Ind.
Whiting Corp., Harvey, Ill.
Will-Burt Co., Orrville, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

(61 lb. to 300 lb. per hr.)

American Coal Burner Co., Chicago, Ill.
Anchor Stove & Range Co., New Albany, Ind.
Auburn Stoker Co., Auburn, Ind.
Automatic Stoker Corp., Milwaukee.
Babcock & Wilcox Co., New York City.
Bluffton Mfg. Co., Findlay, O.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Brownell Co., Dayton, O.
Burke Stoker & Mfg. Co., Chicago.
Burnham Stoker Co., Vancouver, Wash.
Butler Mfg. Co., Kansas City, Mo.
Butler Street Foundry & Iron Co., Chicago, Ill.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Chicago Automatic Stoker Co., Inc., Chicago, Ill.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Columbus Metal Products Inc., Columbus, O.
Conco Corporation, Mendota, Ill.
Crown Iron Works, Minneapolis, Minn.
Delta Stoker Co., North Chicago, Ill.
Detroit Stoker Co., Detroit and Monroe, Mich.
Diamond Castings Co., Johnsonburg, Pa.
Econocol Stoker Div. of Cotta Transmission Corp., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Electric Furnace-Man, Inc., New York City.
Fairbanks, Morse & Co., Chicago, Ill.
Firemood Machine Wks., Converse, Ind.
Flynn & Emrich Co., Baltimore, Md.
●Frederick Iron & Steel Co., Frederick, Md.
Fuel Savers Inc., Harrisburg Pa.
Gehl Bros. Mfg. Co., West Bend, Wis.
General Machinery Co., Spokane, Wash.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
Hall-Neal Furnace Co., Indianapolis, Ind.
Hamilton Automatic Stoker Corp., Hamilton, O.
Hare Stoker Corp., Detroit, Mich.
Heating Assurance, Inc., Spokane, Wash.
Hemp Engineering & Stoker Corp., Macomb, Ill.
Her-Born Eng. & Mfg. Co., Sandusky, O.
Heritage Stoker Sales, Inc., Chicago, Ill.
Hoffman Combustion Eng. Co., Detroit.
Holcomb & Hoke Mfg. Co., Indianapolis, Ind.
Illinois Iron & Bolt Co., Chicago, Ill.
International Engineering Wks., Inc., Framingham, Mass.
Iron Fireman Mfg. Co., Cleveland, O.
Jacobson Machine Works, Inc., A. E., Minneapolis, Minn.
Johnston & Jennings Co., Cleveland, O.
Kol-Master Corp., Oregon, Ill.
Leffel & Co., James, Springfield, O.
Leach Co., Oshkosh, Wis.
Link-Belt Co., Chicago, Ill.
McClave-Brooks Co., Scranton, Pa.
Macrae, Inc., Brooklyn.
Mallory Sales Co., Dolton, Ill.
Marion Machine Foundry & Supply Co., Marion, Ind.
Mesker & Co., Geo. L., Evansville, Ind.
●Meyer Furnace Co., Peoria, Ill.
Model Mfg. Co., Richmond, Va.
Moloch Foundry & Machine Co., Kaukauna, Wis.
Motorstokor Div. of Hershey Machine & Foundry Co., Manheim, Pa.
Muncie Gear Works, Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Neemes Foundry Inc., Troy, N. Y.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman Co., St. Louis, Mo.
Over-Spred Stoker Co., Ottawa, Ill.
Patterson Foundry & Machine Co., East Liverpool, O.
Peabody Engineering Corp., New York City.
Perfectaire Corp., Baltimore, Md.
Perfection Grate & Stoker Co., Springfield, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Racine Stoker Mfg. Co., Racine, Wis.
Riley Stoker Corp., Worcester, Mass.
Rosedale Fdry. & Mach. Co., N. S., Pittsburgh, Pa.
Schwab Furnace & Mfg. Co., Milwaukee.
Schwab Safe Co., Lafayette, Ind.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sinker-Davis Co., Indianapolis, Ind.
Spencer Heater Div., Williamsport, Pa.
Standard Stoker Corporation, New Albany, Ind.
Steel Products Engineering Co., Springfield, O.
Stok-A-Fire Co., Inc., University City, Mo.

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Stokermatic Co., Salt Lake City, Utah.
Stoker Products, Inc., Decatur, Ill.
Susquehanna Engineering Co., Bloomsburg, Pa.
Taylor Engineering Co., Cincinnati, O.
Tropic-Air Stoker Co., Canton, O.
U. S. Machine Corporation, Lebanon, Ind.
Wayne Oil Burner Corp., Fort Wayne, Ind.
Whiting Corp., Harvey, Ill.
Will-Burt Co., Orrville, O.

STRAINERS, CONDUCTOR

See Fittings and Accessories, Conductor

STRAPS, LEADER

See Fittings and Accessories, Conductor

SWITCHES, MAGNETIC

Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., New York City.
Bender Warrick Corp., Birmingham, Mich.
Clark Controller Co., Cleveland.
●Cook Electric Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
●Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia, Pa.
Electric Controller & Mfg. Co., Cleveland, O.
●General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
H-B Instrument Co., Inc., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn. (Mercury Tube)
Industrial Engineering Corp., Evansville, Ind.
Jefferson Electric Co., Bellwood, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., Baltimore, Md.
Palmer Electric Co., Chicago.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Trumbull Electric Mfg. Co., Plainville, Conn.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
●White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago.

SWITCHES, MANUAL

Allen-Bradley Co., Milwaukee, Wis.
Bender Warrick Corp., Birmingham, Mich.
Cutler-Hammer, Inc., Milwaukee, Wis.
Durakool, Inc., Elkhart, Ind. (Mercury)
Electric Controller & Mfg. Co., Cleveland, O.
General Electric Co., Schenectady, N. Y.
Industrial Engineering Corp., Evansville, Ind.
Square D Co., Detroit, Mich.
Trumbull Electric Mfg. Co., Plainville, Conn.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

SWITCHES, TIME

Automatic Temperature Control Co., Inc., Philadelphia.
Au-Temp-Co. Corp., New York City.
Cramer Company, Inc., R. W., Centerbrook, Conn.
●Detroit Lubricator Co., Detroit.
Edison Electrical Controls Div., Thos. A. Edison, Inc., West Orange, N. J.
●General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
●Gleason-Avery, Inc., Auburn, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Industrial Engineering Corp., Evansville, Ind.
●Mercoid Corp., Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis.
Palmer Electric Co., Chicago.
Paragon Electric Co., Chicago, Ill.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
Rhodes, Inc., M. H., Hartford, Conn.
Sampsel Time Control, Inc., Mendota, Ill.
Sangamo Electric Co. Springfield, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
Ward Leonard Electric Co., Mt. Vernon, N. Y.

TEES, FURNACE PIPE

See Fittings and Accessories, Furnace Pipe

TEMPERATURE CONTROLS

See Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TINPLATE

See Sheets, Tin

TIPS, DAMPER

See Clips and Tips, Damper

THERMOMETERS, INDICATING

Barclay, Inc., Robert, Chicago, Ill.
Bristol Co., Waterbury, Conn.
Brown Instrument Co., Div. of Minneapolis-Honeywell Reg. Co., Philadelphia, Pa.
Builders Iron Foundry, Providence, R. I.
Cooper Oven Thermometer Co., Pequabuck, Conn.
Defender Automatic Regulator Co., St. Louis.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez & Sons, Julien P., Baltimore.
G. M. Mfg. Co., New York City.
H-B Instrument Co., Inc., Philadelphia, Pa.
●Illinois Testing Laboratories, Inc, Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Bridgeport, Conn.
Marsh Corporation, Jas. F., Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, New York City.
Palmer Co., Cincinnati.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York City.
Rochester Mfg. Co., Rochester, N. Y.
Tagliabue Mfg. Co., C. J., Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Weston Electrical Instrument Corp., Newark, N. J.

THERMOSTATS, DAY AND NIGHT, CLOCK

Au-Temp-Co Corp., New York City.
●Detroit Lubricator Co., Detroit, Mich.
●General Controls Co., Glendale, Cal.
●General Electric Co., Bloomfield, N. J.
●Gleason-Avery, Inc., Auburn, N. Y.
●Mercoid Corporation, Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Sampsel Time Control, Inc., Mendota, Ill.
Tork Clock Co., Inc., Mt. Vernon, N. Y.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, HEAT ACCELERATED OR ANTICIPATING

Au-Temp-Co Corp., New York City.
Automatic Products Co., Milwaukee, Wis.
●Barber-Colman Company, Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
Fulton Sylphon Co., Knoxville, Tenn.
●General Controls Co., Glendale, Cal.
●General Electric Co., Bloomfield, N. J.
H-B Instrument Co., Inc., Philadelphia, Pa.
●Mercoid Corporation, Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Precision Thermometer and Instrument Co., Philadelphia.
Spencer Thermostat Co., Attleboro, Mass.
Tagliabue Mfg. Co., C. J., Brooklyn.
●White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, LINE VOLTAGE

Allen-Bradley Company, Milwaukee.
Au-Temp-Co. Corp., New York City.
Automatic Products Co., Milwaukee, Wis.
●Barber-Colman Company, Rockford, Ill.
D. & M. Mfg. Co., Midland Park, N. J.
●Detroit Lubricator Co., Detroit, Mich.
Dunn, Inc., Struthers, Philadelphia.
●General Controls Co., Glendale, Cal.
●General Electric Co., Bloomfield, N. J.
H-B Instrument Co., Inc., Philadelphia, Pa.
Jefferson Electric Co., Bellwood, Ill.
●Mercoid Corporation, Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
Ranco Inc., Columbus, O.
Russell Electric Co., Chicago, Ill.
Sampsell Time Control, Inc., Mendota, Ill.
Spencer Thermostat Co., Attleboro, Mass.
United Electric Controls Co., South Boston, Mass.
●White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, LOW VOLTAGE

Au-Temp-Co Corp., New York City,
Automatic Products Co., Milwaukee, Wis.
●Barber-Colman Company, Rockford, Ill.
●Cook Electric Co., Chicago, Ill.
Crise Electric Mfg. Co., Mt. Vernon, O.
D. & M. Mfg. Co., Midland Park, N. J.
●Detroit Lubricator Co., Detroit, Mich.
●General Controls Co., Glendale, Cal.
●Gleason-Avery, Inc., Auburn, N. Y.
H-B Instrument Co., Inc., Philadelphia, Pa.
McCorkle Co., D. H., Berkeley, Cal.
●Magnet Switch Co., Chicago.
●Mercoid Corporation, Chicago, Ill.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corporation, Milwaukee, Wis.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Sampsel Time Control, Inc., Mendota, Ill.
Sheer Co., H. M., Quincy, Ill.
Spencer Thermostat Co., Attleboro, Mass.
Russell Electric Co., Chicago, Ill.
United Electric Controls Co., South Boston, Mass.
●White Manufacturing Co., St. Paul, Minn.
●White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, MODULATING OR PROPORTIONING

Atlas Valve Company, Newark, N. J. (Air Operated)
Au-Temp-Co Corp., New York City.
●Barber-Colman Company, Rockford, Ill.
H-B Instrument Co., Inc., Philadelphia, Pa.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Tagliabue Mfg. Co., C. J., Brooklyn.
●White Manufacturing Co., St. Paul, Minn.

THROUGH WALL FLASHINGS

See Flashings, Through Wall

TINNING FLUXES

See Compounds, Tinning

TOOLS, FIRING

Adams Company, The, Dubuque, Iowa.
●Farrell-Cheek Steel Company, Sandusky, Ohio.
●Northwestern Stove Repair Co., Chicago.
Stratton & Terstegge Co., Louisville, Ky. (Clinker Tongs)

TOOLS, METAL WORKERS'

●Champion Tool Co., Los Angeles, Cal. (Pipe Crimper)
●Crescent Tool Co., Jamestown, N. Y. (Scratch Awls, Pliers, Screw-drivers)
Grobet File Corp. of America, New York City. (Files)
Hub Specialty Co., Somerville, Mass. (Awl)
Millers Falls Co., Greenfield, Mass. (Hack Saws)
Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary Hack Saw and Blades, and Hole Saw)
●Niagara Machine & Tool Works, Buffalo, N. Y.
Packham Crimper Co., Mechanicsburg, Ohio (Crimping Tongs)
Peck, Stow & Wilcox Co., Southington, Conn.
Pencilsharp Awl & Tool Co., Evansville, Ind. (Scratch Awls).
●Poe, Ralph W., Canton, Ill. (Sheet Metal Cutters)
Snap-On Tools Corp., Kenosha, Wis. (Hammers, Screw Drivers, Chisels, Punches, Wrenches, Soldering Irons & Pliers)
Stanley Tools, New Britain, Conn. (Punches, Hammers, Drills)
Star Electric Motor Co., Bloomfield, N. J. (Drill Sharpener)
●Whitney Mfg. Co., W. A., Rockford, Ill.
●Whitney Metal Tool Co., Rockford, Ill.
●Wodack Electric Tool Corp., Chicago. (Electric Hammer and Groover)

TOOLS, ROOFERS'

Aeroil Burner Co., Inc., West New York, N. J. (Melting Pots).
All States Roofers Equip. & Mat'l Co., Chicago. (Complete Line)
Elermann Floor Scraper Co., Brooklyn, N. Y. (Tar)
Littleford Bros., Cincinnati, O.
●Milcor Steel Co., Milwaukee, Wis.
●Niagara Machine & Tool Works, Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Pencilsharp Awl & Tool Co., Evansville, Ind.

TOPS, CHIMNEY

See Caps and Tops, Chimney

TORCHES, BRAZING, CUTTING, WELDING, OXY-ACETYLENE

Air Reduction Sales Co., New York City.
Bastian-Blessing Co., Chicago, Ill.
Bernz Co., Inc., Otto, Rochester, N. Y. (Brazing)
Burdett Mfg. Co., Chicago, Ill.
Clayton & Lambert Mfg. Co., Detroit.
Dockson Co., C. H., Detroit.
Gasweld Equipment Co., Chicago.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
●Johnson Gas Appliance Co., Cedar Rapids, Iowa.
Linde Air Products Co., The, New York City.
Milburn Co., Alexander, Baltimore, Md.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Co., Chicago, Ill.
Welding Apparatus Co., Chicago, Ill.

TORCHES, SOLDERING

Bastian Blessing Co., Chicago.
Bernz Co., Inc., Otto, Rochester, N. Y.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Detroit Torch & Mfg. Co., Detroit, Mich.
Diener Mfg. Co., Geo. W., Chicago, Ill.
Everhot Mfg. Co., Maywood, Ill.
Gasweld Equipment Co., Chicago.
Harris Calorific Co., Cleveland, O.
Hauck Mfg. Co., Brooklyn, N. Y.
Ideal Commutator Dresser Co., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Insto-Gas Corporation, Detroit.
●Johnson Gas Appliance Co., Cedar Rapids, Ia.
Linde Air Products Co., The, New York City.
Milburn Co., Alexander, Baltimore, Md.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Reliable Gas Products Co., Cedar Rapids, Ia.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Co., Chicago, Ill.
Turner Brass Works, Sycamore, Ill.
Welding Apparatus Co., Chicago, Ill.

TRANSFORMERS, LOW VOLTAGE

●Barber-Colman Co., Rockford, Ill.
Canarsey Electric Manufacturing Co., Kansas City, Mo.
●Cook Electric Co., Chicago, Ill.
●Detroit Lubricator Co., Detroit, Mich.
Friez & Sons, Julien P., Baltimore.
●General Controls Co., Glendale, Cal.
General Electric Co., Schenectady, N. Y.
Ideal Commutator Dresser Co., Sycamore, Ill.
Jefferson Electric Co., Bellwood, Ill.
●Mercoid Corporation, Chicago.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pioneer Heat Regulator Div., Master Electric Co., Dayton, O.
Russell Electric Co., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.

TRIM, ORNAMENTAL

See Moulding and Trim, Ornamental

TUBING, COPPER

●American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
●G & O Mfg. Co., New Haven, Conn. (Finned)
●Hussey & Co., C. G., Pittsburgh, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Parker Appliance Co., Cleveland.
Phelps Dodge Copper Products Corp., British American Tube Div., New York City.

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Revere Copper & Brass Incorporated, New York City.
Roberts Tube Works, Detroit.
●Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
Streamline Pipe & Fittings, Div. of Mueller Brass Co., Port Huron, Mich.
United States Brass & Copper Co., Hyde Park, Mass.
Wolverine Tube Co., Detroit, Mich.

UNITS, WINDOW VENTILATOR AND FILTER

Ad-Lee Co., Inc., Chicago.
Airgard Manufacturing Co., Chicago.
Amirton Co., New York, N. Y.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Burrowes Corp., Portland, Me.
Carrier Corp., Syracuse, N. Y.
Davies Air Filter Corp., New York, N. Y.
General Refrigeration Corp., Beloit, Wis.
Ilg Electric Ventilating Co., Chicago.
Jaden Manufacturing Co., Inc., F., Hastings, Nebr.
Kaiser Co., H. S., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis.
Mellish & Murray Co., Chicago.
National Standard Air Products Co., Chicago.
Reed Unit-Fans, Inc., New Orleans, La.
Somers, Inc., H. J., Detroit, Mich.
Standard Air Conditioning, Inc., New York, N. Y.
Staynew Filter Corp., Rochester, N. Y.
Todd Air Conditioning Company, Inc., Bonner Springs, Kan.
Unified Air Conditioner Co., Duluth, Minn.
●U. S. Air Conditioning Corp., Minneapolis.
Utility Fan Corp., Los Angeles.

VACUUM CLEANERS FOR FURNACES

See Cleaners, Vacuum, Furnace

VALVES, GAS PRESSURE REGULATING

Atlas Valve Co., Newark, N. J.
●Barber Gas Burner Co., Cleveland, O.
Belfield Co., H., Philadelphia.
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Co., Cleveland, O.
Fisher Governor Co., Marshalltown, Ia.
Friez & Sons, Julien P., Baltimore.
Fulton Sylphon Co., Knoxville, Tenn.
●General Controls Co., Glendale, Cal.
Golden-Anderson Valve Specialty Co., Pittsburgh.
Hotstream Heater Co., Cleveland, O.
●Mercoid Corp., Chicago, Ill.
Milwaukee Gas Specialty Company, Milwaukee.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
●Pacific Gas Radiator Co., Huntington Park, Cal.
●Payne Furnace & Supply Co., Beverly Hills, Cal.
Perfex Corporation, Milwaukee.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Sheer Co., H. M., Quincy, Ill.
Tagliabue Mfg. Co., C. J., Brooklyn.

VALVES, HUMIDIFIER, WATER LEVEL

Automatic Humidifier Co., Cedar Falls, Ia.
Badger Mfg. & Sales Co., Milwaukee.
Barclay, Inc., Robert, Chicago.
Belfield Co., H., Philadelphia.
Bishop Humidifier Co., Detroit.
Chandler Co., Cedar Rapids, Ia.
Fisher Governor Co., Marshalltown, Ia.
G. & S. Tool Co., Detroit, Mich.
●General Controls Co., Glendale, Cal.
Golden-Anderson Valve Specialty Co., Pittsburgh.
●Maid-O'-Mist, Inc., Chicago, Ill.
McDonnell & Miller, Chicago, Ill.
●Monmouth Products Co., Cleveland, O.
Rockford Brass Works, Rockford, Ill.
●Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.
●Skuttle Co., J. L., Detroit, Mich.
Supreme Electric Products Corp., Rochester, N. Y.
Universal Blower Co., Birmingham, Mich.
●Viking Air Conditioning Corp., Cleveland.
Wisconsin Humidifier Co., Milwaukee, Wis.

VALVES, SOLENOID

Alco Valve Co., St. Louis, Mo.
Anderson Products, Inc., Cambridge, Mass.
Automatic Products Co., Milwaukee, Wis.
Automatic Switch Co., New York City.
Au-Temp-Co Corp., New York City.
●Barber-Colman Co., Rockford, Ill.
Belfield Co., H., Philadelphia.
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Cooper Co., Clark, Philadelphia.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago.
●Detroit Lubricator Co. Detroit.
Electric Valve Mfg. Co., Inc., New York City.
Electrimatic Corp., Chicago, Ill.
Friez & Sons, Julien P., Baltimore.
●General Controls Co., Glendale, Cal. (Magnetic)
General Electric Co., Schenectady, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Guardian Electric Mfg. Co., Chicago, Ill.
Hammett Mfg. Co., Kansas City, Mo.
Hubbell Corp., Chicago.
Hunt & Son, C. B., Salem, O.
McDonnell & Miller, Chicago.
●Mercoid Corp., Chicago, Ill.
Milwaukee Gas Specialty Company, Milwaukee.
●Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Parker Appliance Co., Cleveland.
●Penn Electric Switch Co., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pfening Co., Fred D., Columbus, O.
Rega Mfg. Co., Rochester, N. Y.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Salem, Mass.
Spoehrer-Lange Co., St. Louis.
Supreme Electric Products Corp., Rochester, N. Y.
Wheelco Instruments Co., Chicago.

VANES, DUCT TURNING, PREFABRICATED

●Barber-Colman Company, Rockford, Ill.
Pernot & Rich, Inc., Los Angeles.
●Tuttle & Bailey, Inc., New Britain, Conn.
Waterloo Register Company, Waterloo, Iowa.

VENTILATORS, CEILING

Airmaster Corp., Chicago, Ill.
●Auer Register Co., Cleveland, O.
Autovent Fan & Blower Co., Chicago, Ill.
●Barber-Colman Company, Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Champion Blower & Forge Co., Lancaster, Pa.
Decatur Iron & Steel Co., Decatur, Ala.
Economy Electric Manufacturing Co., Cicero, Ill.
Falstrom Co., Passaic, N. J.
Gillian Mfg. Co., Detroit.
●Hart & Cooley Mfg. Co., Chicago, Ill.
Hudson Equipment Corp., Minneapolis, Minn.
Klauer Manufacturing Co., Dubuque, Ia.
●Lamneck Products Co., Columbus, O.
Martin Metal Mfg. Co., Wichita, Kan.
●Milcor Steel Co., Milwaukee, Wis.
Miller & Doing, Inc., Brooklyn, N. Y.
●Tuttle & Bailey, Inc., New Britain, Conn.
●United States Register Co., Battle Creek, Mich.
Universal Blower Co., Birmingham, Mich.

VENTILATORS, MUSHROOM

Aeolus Dickinson, Chicago, Ill.
Best Register Co., Milwaukee, Wis.
Falstrom Co., Passaic, N. J.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
Knowles Mushroom Ventilator Co., Montclair, N. J.
Mellish & Murray Co., Chicago, Ill.
●Mueller Furnace Co., L. J., Milwaukee, Wis.
Penn Ventilating Co., Philadelphia.
●Standard Stamping & Perforating Co., Chicago.
●Tuttle & Bailey, Inc., New Britain, Conn.
Ventilating Products Co., Chicago.

VENTILATORS, ROOF, FAN

Aeolus Dickinson, Chicago, Ill.
●Air Controls, Inc., Cleveland, O.
Airmaster Corp., Chicago, Ill.
●Allen Corp., Detroit, Mich.
American-Larson Ventilating Co., Pittsburgh, Pa.
Arex Co., Chicago, Ill.
Autovent Fan & Blower Co., Chicago, Ill.
Belanger Fan & Blower Co., Detroit, Mich.
Brundage Co., Kalamazoo, Mich.
Burt Mfg. Co., Akron, O.
California Cornice, Steel & Supply Corp., Los Angeles, Cal.
●Century Fan & Ventilating Corp., New York City. (Turbine)
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., New York City.
Clay Equipment Corp., Cedar Falls, Ia.
Davidson Hy Duty Roof Fan Co., Newton, Mass.
DeBothezat Ventilating Equipment Division, American Machine & Metals, Inc., East Moline, Ill.
Economy Electric Mfg. Co., Cicero, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.

● Advertisement in this issue. See Index to Advertisers, page 306

Falstrom Co., Passaic, N. J.
Fingles, Inc., W. A., Baltimore, Md.
General Regulator Corp., Chicago, Ill.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe and Dust Arrester Co., Grand Rapids, Mich.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Howes Co., S. M., Charlestown, Boston, Mass.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Johnson Fan & Blower Corp., Chicago, Ill.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
Klauer Manufacturing Co., Dubuque, Ia.
Lohman Inc., William J., New York City.
Myers Electric Co., Pittsburgh, Pa.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
Osborn Co., J. M. & L. A., Cleveland.
Penn Ventilating Co., Philadelphia, Pa.
Propellair, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Russell Co., F. C., Cleveland, O.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Shreveport Engineering Co., Inc., Shreveport, La.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
●Swartwout Co., Cleveland.
Trade-Wind Motor Fans, Inc., Los Angeles, Cal.
●U. S. Air Conditioning Corp., Minneapolis.
●Uno Ventilator Co., Cliftondale, Mass.
Utility Fan Corporation, Los Angeles.
●Viking Air Conditioning Corp., Cleveland, O.
Washburne & Co., E. G., New York City.
Western Engineering & Mfg. Co., Los Angeles, Cal.
Wing Mfg. Co., L. J., New York City.

VENTILATORS, ROOF, GRAVITY

●Accurate Mfg. Works, Chicago, Ill.
Aeolus Dickinson, Chicago, Ill.
Airtherm Mfg. Co., St. Louis, Mo.
●Allen Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
American-Larson Ventilating Co., Pittsburgh, Pa.
American Sheet Metal Works, New Orleans, La.
Ames Co., W. R., San Francisco, Cal.
Anderson Mfg. Co., Des Moines, Ia.
Arex Co., Chicago, Ill.
Autoforce Ventilating Systems, Boston.
●Berger Bros. Co., Philadelphia, Pa.
Burt Mfg. Co., Akron, O.
California Cornice, Steel & Supply Corp., Los Angeles.
●Century Fan & Ventilator Corp., New York City.
Chicago Metal Mfg. Co., Chicago, Ill.
●Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Clay Equipment Corp., Cedar Falls, Ia.
Day Co., The, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Edwards Mfg. Co., Inc., Cincinnati, O.
Falstrom Co., Passaic, N. J.
Fingles, Inc., W. A., Baltimore, Md.
Goethel Co., Alfred C., Milwaukee, Wis.
Grand Rapids Blow Pipe & Dust Arrester Co., Grand Rapids, Mich.
Hirschman Co., Inc., W. F., Buffalo, N. Y.
Howes Co., S. M., Charlestown, Boston, Mass.
Hudson Equipment Corp. Minneapolis, Minn.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
International Steel Co., Evansville, Ind.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jamar Co., Walker, Duluth, Minn.
Jordan & Co., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Ventilating Co., Owatonna, Minn.
Klauer Manufacturing Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.
●Lamneck Products, Inc., Columbus, O.
Lee & Son Co., Thomas, Cincinnati, O.
●Levow, David, New York City.
Little Burner Co., Inc., H. C., San Rafael, Cal.
Martin Metal Mfg. Co., Wichita, Kan.
Mellish & Murray Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
●Meyer & Bro. Co., F., Peoria, Ill.
●Milcor Steel Co., Milwaukee, Wis.
Norman Sheet Metal Mfg. Co., W. F., Nevada, Mo.
●Osborn Co., J. M. & L. A., Cleveland.
Patten Co., J. V., Sycamore, Ill.
Penn Ventilating Co., Philadelphia, Pa.
Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Ryniker Sheet Metal Works, Inc., Billings, Mont.
St. Paul Corrugating Co., St. Paul, Minn.
Schoedinger Co., F. O., Columbus, O.
Southbridge Roofing Co., Inc., Southbridge, Mass.
Southern States Iron Roofing Co., Savannah, Ga.
●Swartwout Co., Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Art Metal Co., Tiffin, O.
●Uno Ventilator Co., Cliftondale, Mass.
Van Noorden Co., E. Boston, Mass.
Waverly Heating Supply Co., Boston.
Western Engineering & Mfg. Co., Los Angeles.
Willis Mfg. Co., Galesburg, Ill.
York Corrugating Co., York, Pa.

WARM AIR REGISTER SHIELDS

See Shields, Warm Air Register

WASHERS, AIR, HEATING AND VENTILATING

(Capacity 4,000 c.f.m. and up)

Air & Refrigeration Corp., New York City.
American Blower Corp., Detroit, Mich.
●American Foundry & Furnace Co., Bloomington, Ill.
Ames Co., W. R., San Francisco, Cal.
Atlas Heating & Ventilating Co., Ltd., San Francisco.
Autovent Fan & Blower Co., Chicago, Ill.
Ballantyne Co., Omaha, Nebr.
Bayley Blower Co., Milwaukee, Wis.
Belanger Fan & Blower Co., Detroit.
Betz Air Conditioning Corp., Kansas City, Mo.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., E. K., Kansas City, Mo.
Carrier Corp., Syracuse, N. Y.
●Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
Cooling Tower Co., Inc., Div. Fluor Corp., Ltd., New York City.
Dail Steel Products Co., Lansing, Mich.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Gehri Co., Tacoma, Wash.
Industrial Sheet Metal Works, Inc., Detroit, Mich.
King Ventilating Co., Owatonna, Minn.
MaGirl Foundry & Furnace Works, P. H., Bloomington, Ill.
Mellish & Murray Co., Chicago, Ill.
●Mueller Furnace Co., L. J., Milwaukee.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York City.
Northern Blower Co., Cleveland, O.
Penn Cooling Tower Works, Pittsburgh.
Peterson "Freezem" Mfg. & Sales Co., Kansas City, Mo.
Spray Engineering Co., Somerville, Mass.
Spray-Wheel Air Conditioners, Inc., Denver, Colo.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
Supreme Heater & Ventilating Corp., St. Louis, Mo.
Todd Air Conditioning Company, Inc., Bonner Springs, Kan.
Trane Co., La Crosse, Wis.
Unit Heater & Cooler Co., Wausau, Wis.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utica Radiator Corp., Utica, N. Y.
Utility Fan Corporation, Los Angeles, Cal.
Vilter Mfg. Company, Milwaukee.
Western Blower Co., Seattle, Wash.
York Ice Machinery Corp., York, Pa.

WATERPROOFING

Chase Brass & Copper Co., Waterbury, Conn.
Cheney Co., Philadelphia.
Flintkote Co., New York City.
Horn Co., A. C., Long Island City.
Sisalkraft Co., Chicago, Ill.
Truscon Laboratories, Detroit.

WATER HEATERS

See Coils, Fire Pot, Hot Water

WELDERS, ARC

Adams Mfg. Co., J. D., Indianapolis, Ind.
Allis-Chalmers Manufacturing Company, Milwaukee.
Alter-Arc Mfg. Co., Lawton, Okla.
Burke Electric Co., Erie, Pa.
Commonwealth Mfg. Corp., Cincinnati, O.
Crise Electric Mfg. Co., Mt. Vernon, O.
●Eisler Engineering Co., Newark, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Emerson Electric Mfg. Co., St. Louis.
General Equipment Co., Wichita, Kan.

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General Electric Co., Schenectady, N. Y.
Giant Grip Mfg. Co., Oshkosh, Wis.
Hammett Mfg. Co., Kansas City, Mo.
Hampton Elec. Tool Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis. (Electric).
Hobart Brothers Co., Troy, O.
Hollup Corp., Chicago.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Lee & Son Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Maple Valley Mfg. Co., Mapleton, Ia.
Marquette Mfg. Co., Inc., Minneapolis, Minn.
Master Welders, Kansas City, Mo. (A. C.)
Miller Electric Mfg. Co., Inc., Appleton, Wis. (Portable)
Ohio Welder Co., Middlefield, O.
Owen-Dyneto Div. USL Battery Corp., Syracuse, N. Y.
Pier Equipment Manufacturing Co., Benton Harbor, Mich.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Star Electric Motor Co., Bloomfield, N. J.
Trindl, Inc., Jos. H., Chicago.
Una Welding, Inc., Cleveland, O.
Universal Power Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Nebr. (A. C.)
Wilson Welder & Metals Co., Inc., New York City.

WELDERS, SPOT

Acme Electric Welder Co., Huntington Park, Cal.
Agnew Electric Welder Co., Milford, Mich.
Commonwealth Mfg. Corp., Cincinnati, O.
Dyer Welder & Engineering Co., Kansas City, Mo.
●Eisler Engineering Co., Newark, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Machine & Welder Co., Warren, O.
General Electric Co., Schenectady, N. Y.
Giant Grip Mfg. Co., Oshkosh, Wis.
Hammett Manufacturing Co., Kansas City, Mo. (Portable).
Micro Products Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Pier Equipment Manufacturing Co., Benton Harbor, Mich. (Foot operated and motor driven.)
Taylor-Hall Welding Corp., Worcester, Mass.
Taylor-Winfield Corp., Warren, O. (Butt and Seam)
Thomson-Gibb Electric Welding Co., Lynn, Mass.
Universal Power Corp., Cleveland.
Weldex, Inc., Detroit.
Westinghouse Electric & Manufacturing Co., East Pittsburgh.

WELDING EQUIPMENT, OXY-ACETYLENE

Air Reduction Sales Co., New York City.
Automatic Gasflux Co., Cleveland, O.
Bastian Blessing Co., Chicago, Ill.
Burdett Mfg. Co., Chicago, Ill.
Carbo-Oxygen Co., Pittsburgh, Pa.
Gasweld Equipment Co., Chicago, Ill.
Harris Calorific Co., Cleveland, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Jewel Mfg. Co., St. Paul, Minn.
Linde Air Products Co., The, New York City.
Milburn Co., Alexander, Baltimore, Md.
Modern Engineering Co., St. Louis, Mo.
Sight Feed Generator Co., Richmond, Ind.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torchweld Equipment Co., Chicago, Ill.
Victor Equipment Co., Los Angeles, Cal.
Welding Apparatus Co., Chicago, Ill.

WELDING ROD

See Rod, Welding

WELDING TORCHES

See Torches, Brazing, Cutting, Welding

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
●Air Controls, Inc., Cleveland, O.
American Blower Corp., Detroit, Mich.
Autovent Fan & Blower Co., Chicago, Ill.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland.
Brundage Co., Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
●Clarage Fan Co., Kalamazoo, Mich.
Economy Electric Manufacturing Co., Cicero, Ill.
●Furbio Co., Hermansville, Mich.
General Blower Corp., San Francisco.
Hastings Air Conditioning Co., Inc., Hastings, Nebr.
Jaden Mfg. Co., Inc., F., Hastings, Nebr.
●Janette Mfg. Co., Chicago, Ill.
●Lau Blower Co., Dayton, O.
Metal Stamping & Mfg. Co., Cleveland.
New York Blower Co., Chicago.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
●Schwitzer-Cummins Co., Indianapolis, Ind.
Sturtevant Co., B. F., Hyde Park, Boston, Mass.
●Torrington Mfg. Co., Torrington, Conn.
●U. S. Air Conditioning Corp., Minneapolis, Minn.
Utility Fan Corporation, Los Angeles, Cal.
●Viking Air Conditioning Corp., Cleveland, O.
Western Blower Company, Seattle, Wash.

WINDOWS, HEAT INSULATING

Advance Insulating Co., Pittsburgh.
Chamberlin Metal Weather Strip Co., Detroit.
Detroit Steel Products Co., Detroit, Mich.
Libbey-Owens-Ford Glass Co., Toledo, O.
Russell Co., F. C., Cleveland, O.
Truscon Steel Co., Youngstown, O.

WINDOWS, HOLLOW METAL

American Sheet Metal Works, New Orleans, La.
Biersach & Neidermeyer Co., Milwaukee, Wis.
Herrmann & Grace Co., Brooklyn, N. Y.
International Steel Co., Evansville, Ind.
Newman Brothers, Inc., Cincinnati, O.
Perkinson & Brown, Chicago, Ill.
Russell Co., F. G., Cleveland, O.
Truscon Steel Co., Youngstown, O.
Willis Mfg. Co., Galesburg, Ill.

WIRE, PLAIN, GALVANIZED AND COPPERED

Aluminum Co. of America, Pittsburgh, Pa. (Aluminum)
American Nickeloid Co., Peru, Ill. (Chrome, nickel coated)
American Steel & Wire Co., Chicago, Ill.
Angell Nail & Chaplet Co., Cleveland.
Berger Mfg. Div. Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa. (Plain, galvanized)
California Wire Cloth Corp., Oakland, Cal.
●Carnegie-Illinois Steel Corp., Pittsburgh, Pa.
Chase Brass & Copper Co., Inc., Waterbury, Conn.
Chicago Steel & Wire Co., Chicago, Ill.
●Columbia Steel Co., San Francisco, Cal.
Continental Steel Corp., Kokomo, Ind. (Plain, galvanized steel)
Copperweld Steel Co., Glassport, Pa. (Copper covered steel)
Gulf States Steel Co., Birmingham, Ala.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Galvanized)
Ludlow-Saylor Wire Co., St. Louis, Mo. (Cloth)
Page Steel & Wire Div., Monessen, Pa.
●Republic Steel Corp., Cleveland, O. (Steel)
Roebling's Sons Co., John A., Trenton, N. J.
●Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Townsend Co., New Brighton, Pa. (Plain and coppered)
Western Wire & Iron Works, Inc., Chicago, Ill.
Wheeling Corrugating Co., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wickwire Spencer Steel Co., New York City.
●Youngstown Sheet & Tube Co., Youngstown, O.

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Section of

American Artisan

1940 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

[Section 2—TRADE NAMES]

A

ABC—Blower-Filter and Blower-Washer units. American Blower Corp., Detroit.

ABC—Air Conditioning Furnaces and Oil Burners. Automatic Burner Corp., Chicago, Ill.

A-P—Controls, Motors, Thermostats, Valves. Automatic Products Co., Milwaukee, Wis.

Ablo—Waterproofing Compounds, American Barlock Co., Inc.. Long Island City, N. Y.

Abrasoweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Acco-Lastic—Caulking Compounds. Accurate Metal Weather Strip Co., New York, N. Y.

Ace—Mallets. Fowler-Penn Co., Emeryville, Cal.

Ace—Arc and Spot Welders. Pier Equipment Mfg. Co., Benton Harbor, Mich.

Acidseal—Paint. B. F. Goodrich Co., Akron, O.

Acousti-Pad—Insulation. Burgess Battery Co., Chicago, Ill.

Acratherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Activ-Air—Air Conditioning Furnaces. Heil Co., Milwaukee, Wis.

Activ-Flame—Oil Burners. Heil Co., Milwaukee, Wis.

Aeracool—Fan Blades, Fans, Louvres and Shutters, Ventilators. Myers Electric Co., Pittsburgh, Pa.

Aerisweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Aerocrat—Fans, Louvres, Washers. W. R. Ames Co., San Francisco, Cal.

Aerofelt—Duct Insulation Johns-Manville, New York City.

Aerofuse — Air Diffusers. Tuttle & Bailey, Inc., New Britain, Conn.

Aerolux—A. C. Furnaces. S. T. Johnson Co., Oakland, Cal.

Aeropel—Kitchen Exhaust Fans. American Blower Corp., Detroit, Mich.

Aeroplane—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.

Aeroplex—Blowers. Bayley Blower Co., Milwaukee, Wis.

Aeropull—Ventilators. Paul R. Jordan & Co., Indianapolis, Ind.

Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.

Aerovalve—Ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.

Afco—Furnaces. American Furnace Co., St. Louis, Mo.

Affco — Grilles, Louvres, Registers. American Foundry & Furnace Co., Bloomington, Ill.

Air-Acoustic — Insulation. Johns-Manville, New York City.

Airate—Fans and Ventilators. Air Controls, Inc., Cleveland.

Airco—Soldering Flux, Welding Rod, Torches and Welding Equipment. Air Reduction Sales Co., New York City.

Air-Con—Heating & Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Air Control—Air Conditioning Units, Bearings, Blowers, Blower-Filters, Blower Housings and Wheels. Hastings Air Conditioning Co., Inc., Hastings, Nebr.

Airex—Air Conditioning Units, Blowers and Fans. Mountain States Equipment Co., Denver, Colo.

Air-Flo—Ventilators. Belanger Fan & Blower Co., Detroit.

Aire-Flo—Blower Units and Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

AireOzonet—Air Conditioning Furnace. AireOzone Corp., Chicago.

Aire-Ray-Ator — Furnaces. Ray Oil Burner Co., San Francisco.

Airflo — Furnaces. Alladdin Heating Corp., Oakland, Cal.

Airfoil—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.

Airguide—Hygrometers and Thermometers. Fee & Stemwedel, Inc., Chicago, Ill.

Airistocrat—Fan Blades. Torrington Mfg. Co., Torrington, Conn.

Airite—Furnaces. Trane Co., La Crosse, Wis.

Airklenzer—Furnaces. Round Oak Co., Dowagiac, Mich.

Airline—Furnaces. Joliet Heating Corp., Joliet, Ill.

Airline—Registers & Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Air-Marvels—Fans. General Blower Co., Philadelphia, Pa.

Airmaster—Air Conditioning Units. Thatcher Co., Newark, N. J.

Airmat—Filters. American Air Filter Co., Inc., Louisville, Ky.

Airmode—Air Conditioning Units, Fans and Window Ventilator and Filter Units. National Standard Air Products Co., Chicago.

Air-O-Mist—Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.

Air-Pak—Blower-Filter Units. Air Controls, Inc., Cleveland.

Airplex — Filters. Davies Air Filter Corp., New York, N. Y.

Airpyrator — Blowers. Burnwell Corp., Allentown, Pa.

Airate—Fans and Ventilators. Air Controls, Inc., Cleveland.

Airseal—Insulation. Rock Wool Products Co., Inc., Wabash, Ind.

Airstat—Controls. Minneapolis-Honeywell Regulator Co., Minneapolis.

Airstream—Blower Wheels. The Metal Stamping & Mfg. Co., Cleveland.

Airvulc—Concrete Waterproofing Paint. Self-Vulcanizing Rubber Co., Inc., Chicago, Ill.

Akron—Air Blast Furnaces. May-Fiebeger Co., Newark, Ohio.

Alaska—Coils. Star Radiator Co., Los Angeles, Cal.

Alco—Roof Ventilators, Allen Corp., Detroit, Mich.

Alcoa—Aluminum Products. Aluminum Co. of America, Pittsburgh, Pa.

Alglas—Skylights. American Barlock Co., Inc., Long Island City, N. Y.

Alladin—Arc Welders. Commonwealth Mfg. Co., Cincinnati, O.

Allegheny—Air Conditioning Furnaces. Pittsburgh Furnace Parts Co., Pittsburgh, Pa.

Allkote—Paint. Acme Refining Co., Cleveland.

All-Season—Air Conditioning Units. Fedders Mfg. Co., Buffalo.

All-Season—Directional Flow Register. Eckenroth Register Co., San Francisco, Cal.

All-Sol—Flux. L. B. Allen Co., Chicago.

All-Weather—Roof Cement, Caulking and Waterproofing Compounds, Roofing Paint. Ford Roofing Products Company, Chicago.

Alma — Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Almar—Corner Lock Forming Machine. Ward Machinery Co., Chicago, Ill.

Almetal—Fire Doors. Merchant & Evans Co., Philadelphia, Pa.

Alnor—Thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.

Alumaweld—Flux and Solder. Lloyd S. Johnson Co., Chicago.

Alumbrite—Paint. Thompson & Co., Pittsburgh, Pa.

Alumi-Flux—Soldering Flux. L. B. Allen Co., Chicago, Ill.

Alumilite—Aluminum Venetian Blinds. Chicago Venetian Blind Co., Chicago.

Aluminweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Always Reliable—Soldering Furnaces, Torches. Otto Bernz Co., Inc., Rochester, N. Y.

Ambrac—Welding Rod. American Brass Co., Waterbury, Conn.

Amco—Flux. American Solder & Flux Co., Philadelphia, Pa.

American—Draft Gages. Consolidated Ashcroft Hancock Co., Inc., Bridgeport, Conn.

American — Thermometers. Manning, Maxwell & Moore, Inc., Bridgeport, Conn.

Amerock—Cabinet and Casing Hardware. American Cabinet Hardware Corp., Rockford, Ill.

Aminco—Anemometers. American Instrument Co., Silver Spring, Md.

Amirglass—Air Filters. Amirton Co., New York City.

Anaconda—Copper and Brass Products. American Brass Co., Waterbury, Conn.

Anchor—Furnaces, Oil Burners. Fargo Foundry Co., Fargo, N. D.

Anchor—Roofing Nails. W. H. Maze Co., Peru, Ill.

Anchor—Roofing Paint. A. Wilhelm Co., Reading, Pa.

Anchor Brand—Nails, Rivets. Townsend Co., New Brighton, Pa.

Anderson—Spray Nozzles. B. F. Sturtevant Co., Hyde Park, Mass.

Anode—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Anti-Pluvius—Skylights. G. Drouve Co., Fairfield, Conn.

Apco—Caulking Compounds, Paint. Asphalt Products Co., Syracuse, N. Y.

Apex — Quadrants. Ohio Products Co., Cleveland, O.

Apex—Hangers. Elbows and Fittings. Royal-Apex Mfg. Co., Brooklyn.

Apollo—Roofing. Carnegie-Illinois Steel Co., Pittsburgh, Pa.

Appoloy—Copper Steel. Apollo Steel Company, Apollo, Pa.

Aqua Bar—Roof Cement. Continental Products Co., Euclid, O.

Aqua-Flo—Pumps. The Heil Co., Milwaukee.

Arc-Eng—Air Conditioning Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Arctic—Air Conditioning Units. Premier Furnace Co., Dowagiac, Mich.

Ardent—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

Arex-Austor—Arex Company, Chicago.

Arin Accelerant—Louvers and Shutters. Arex Co., Chicago.

Arin Stationary—Louvers and Shutters. Arex Co., Chicago.

Aristocrat—Fans. Torrington Mfg. Co., Torrington, Conn.

Aristocrat—Registers. Auer Register Co., Cleveland, O.

Armco—Plates, Sheets. American Rolling Mill Co., Middletown, O.

Armorize—Paint. Carter Paint Co., Liberty, Ind.

Armstrong—Compressors. General Machinery Co., Spokane, Wash.

Arrow—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

Arrowtrol — Heating and Ventilating Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Art—Shingles. Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.

Artcraft—Furnace Blowers. Chicago Steel Furnace Co., Chicago, Ill.

Asco—Relays, Switches, Valves. Automatic Switch Co., New York, N. Y.

Aspro—Water-proofing Paint. Asphalt Products Co., Syracuse, N. Y.

Ath-A-Nor — Furnaces. May-Fiebeger Co., Newark, Ohio.

Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.

Attic Vent—Attic Fans. Belco Exhaust Fan Mfg. Co., St. Louis.

Autocrat—Fan Blades. Torrington Mfg. Co., Torrington, Conn.

Automatic—Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

Automatic Butler—Stokers. Butler Mfg. Co., Kansas City, Mo.

Automatic Drip — Humidifiers. Automatic Humidifier Co., Cedar Falls, Iowa.

Automatik—Furnaces. Premier Furnace Co., Dowagiac, Mich.

Axiom—Filters. Blocksom & Company, Michigan City, Ind.

B

BB—Blast Gates, Roof Clips, Damper Clips and Tips, Conductor Fittings and Accessories, Snow Guards. Berger Brothers Company, Philadelphia.

BC—Closet-Type Gas-Fired Air Conditioning Unit. Surface Combustion Corp., Toledo, Ohio.

BCA—Ball Bearings. Bearing Co. of America, Lancaster, Pa.

BE—Blowers, Blower-Filters, Fans. Barrett Engineers, Cleveland Heights, O.

B. F. C.—Gas Burners. Moncrief Furnace & Mfg. Co., Dallas, Tex.

B-H—Insulating Cement. Baldwin-Hill Co., Trenton, N. J.

B-W—Relays, Switches. Bender Warrick Corp., Birmingham, Mich.

B & W—Refractories. Babcock & Wilcox Co., New York City.

Badger—Machines, Metal Workers' Tools, Pumps. Rock River Machine Co., Inc., Janesville, Wis.

Badger—Time Switches. Reliance Automatic Lighting Co., Racine, Wis.

Baertex—Floor and Dado Enamel. Baer Brothers, New York City.

Ballard—Oil Burners and Furnaces. Gilbert & Barker Mfg. Co., Springfield, Mass.

Ball Bearing—Damper Quadrants. Parker-Kalon Co., New York, N. Y.

Bankheat—Oil Burners. S. T. Johnson Co., Oakland, Cal.

Bar-Brook—A. C. Units, Fans, Heaters & Ventilators. Shreveport Eng. Co., Inc., Shreveport, La.

Barcol—Controls, Motors, Thermostats. Barber-Colman Co., Rockford, Ill.

Barlastic—Caulking Compounds. Barland Weatherstrip Material Co., Cleveland.

Barry—Couplings, Pulleys. R. & J. Dick Co., Inc., Passaic, N. J.

Basmor — Air Conditioning Furnace. Bastian-Morley Co., Inc., LaPorte, Ind.

Barton—Heat Savers. Industrial Sheet Metal Works, Inc., Detroit.

Barton—Blower-Filters, Furnace Blowers, Cabinets and Casings, Air Conditioning and Gravity Furnaces, Heaters, Housings and Stampings. National Mfg. & Engineering Co., Detroit.

Battery—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

Bear Cat—Booster Fans. Midwestern Supply Co., Chicago.

Beaver—Furnaces and Heaters. Danville Stove & Mfg. Co., Danville, Pa.

Beehive—Roofing. Samuel Cabot, Inc., Boston, Mass.

Beloit—Machines, Punches, Tools. Hendley & Whittemore Co., Beloit, Wis.

Belt-Air—Ventilating Fans. Belco Exhaust Fan Mfg. Co., St. Louis.

Bemis — Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Benco—Oil Burners. Bennett Co., Omaha, Nebr.

Benefactor—Furnaces. Hess Warming & Ventilating Co., Chicago, Ill.

Bengal—Furnaces. Floyd-Wells Co., Ryersford, Pa.

Bennett-Allison—Oil Burners. Bennett Co., Omaha, Nebr.

Berloy—Building Products. Berger Mfg. Co., Div. Republic Steel Corp., Canton, O.

Berry-Cel—Insulation. F. E. Berry & Co., Everett, Mass.

Bertossa—Air Conditioning and Warm Air Furnaces. Jackson & Church Co., Saginaw, Mich.

Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.

Bethlehem Doe—Oil Burners. Bethlehem Fdy. & Mach. Co., Bethlehem, Pa.

Bettendorf—Oil Burners and Stokers. Micro-Westco, Inc., Bettendorf, Iowa.

Big Sioux—Furnaces. Iowa Foundry Co., Sioux City, Iowa.

Bildrite—Building Insulation. Insulite Co., Minneapolis, Minn.

Bitugloss—Enamels & Lacquers. Wailes Dove-Hermiston Corp., New York City.

Black Diamond—Built-up Roofing. Barrett Co., New York, N. Y.

Black Diamond—Furnaces, Heaters. Maple City Furnace Co., Monmouth, Ill.

Black Diamond—Stokers. Beckley Perforating Co., Garwood, N. J.

Blo-Aire — Blower Housings. Detroit Stamping Co., Detroit.

Blo-Matic—Stokers. Her-Born Engineering & Mfg. Co., Sandusky, O.

Blue Knight—Enamels and Lacquers. Roxalin Flexible Lacquer Co., Elizabeth, N. J.

Boiler Plate — Furnaces. Williamson Heater Co., Cincinnati, O.

Bon-Air—Blower Units, Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Boomer—Furnaces, Heaters. Hess-Snyder Co., Massilon, O.

Boost-Aire—Fans. L. J. Mueller Furnace Co., Milwaukee.

Branford—Oil Burners. Malleable Iron Fittings Co., Branford, Conn.

Breez-Air—Fans. Buffalo Forge Co., Buffalo, N. Y.

Breese—Oil Burners. Columbus Metal Products, Inc., Columbus, O.

Breezo—Kitchen Exhaust Fans. Buffalo Forge Co., Buffalo, N. Y.

Brevolite—Crackle Finish Paint. Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.

Brookcoil—Metal Ceilings. Brooklyn Metal Ceiling Co., Brooklyn, N. Y.

Brilliant Fire — Floor Furnaces and Heaters. Ohio Foundry and Mfg. Co., Steubenville, O.

Bull Dog—Snips and Shears. Wiss & Sons Co., Newark, N. J.

Bung-Lo—Warm Air Furnaces. Geo. J. Cocking, Santa Ana, Cal.

Burke—Pumps. Decatur Pump Co., Decatur, Ill.

Burner-Set—Plibrico Jointless Firebrick Co., Chicago.

Butler—Furnaces. Ramey Mfg. Co., Columbus, O.

C

C-E—Stokers. Combustion Engineering Co., Inc., New York, N. Y.

C-E Skelly—Stokers. Combustion Engineering Co., Inc., New York City.

C-H—Relays, Switches and Valves. Cutler-Hammer, Inc., Milwaukee, Wis.

CID—Pumps. Goulds Pumps, Inc., Seneca Falls, N. Y.

Caco—Oil Burners. Century Engineering Corp., Cedar Rapids, Ia.

Calcor—Eaves Trough and Gutters, Louvers and Shutters, Damper Quadrants, and Skylight Lifts. California Cornice, Steel and Supply Corp., Los Angeles.

Caloric—Furnaces. Marshall Furnace Co., Marshall, Mich.

Calwico—Wire Cloth. California Wire Cloth Corp., Oakland, Cal.

Camel—Valves. C. L. Bryant Corp., Cleveland, O.

Capital—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.

Capitol—Furnaces. United States Radiator Corp., Detroit, Mich.

Capitol Rock Wool—Cement and Insulation. Standard Lime & Stone Co., Baltimore.

Capitolaire—Furnaces. United States Radiator Corp., Detroit.

Carbonaire—Oil Burners. Aldrich Co., Peoria, Ill.

Careycel—Insulation. Philip Carey Co., Cincinnati, O.

Careyduct — Prefabricated Ducts and Fittings. Philip Carey Co., Cincinnati, Ohio.

Carter—Oil Burners. General Oil Heating Corp., West New York, N. J.

Carton Economy—Furnaces. International Heater Co., Utica, N. Y.

Cascade—Desert Coolers. Todd Air Conditioning Co., Inc., Bonner Springs, Kansas.

Case-Schaffer—Furnaces. Western Furnaces, Inc., Tacoma, Wash.

Castalu—Blower Wheels. Advance Aluminum Castings Corp., Chicago, Ill.

Caulk-O-Seal — Caulking and Glazing Compounds. Calbar Paint & Varnish Co., Philadelphia, Pa.

Cel-Lux—Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.

Cementico—Concrete Waterproofing Paint. United States Gypsum Co., Chicago.

Cementite—Paint. Thompson & Co., Pittsburgh, Pa.

Cementkote—Paint. Tropical Paint & Oil Co., Cleveland, O.

Cempro—Concrete Paint. Asphalt Products Co., Syracuse, N. Y.

Challengeaire—Air Conditioning Furnaces. Lochinvar Corp., Dearborn, Mich.

Challenger—Stokers. Kol-Master Corp., Oregon, Ill.

Chamberlin—Automatic Humidifier. Chandler Co., Cedar Rapids, Ia.

Charavay — Fans. Hartzell Propeller Fan Co., Piqua, O.

Checker Coat—Galvanized Steel Sheets. Superior Sheet Steel Co. Div. Continental Steel Corp., Canton, O.

Chicago—Brakes and Presses. Dreis & Krump Mfg. Co., Chicago, Ill.

Chicastic Castable—Refractory. Chicago Fire Brick Co., Chicago, Ill.

Chico Brikset—High Temperature Cement. Chicago Fire Brick Co., Chicago, Ill.

Chief—Furnaces. Joliet Heating Corp., Joliet, Ill.

Chieftain—Refrigerating Compressors. Tecumseh Products Co., Tecumseh, Mich.

Chinook—Heating Coils. Bayley Blower Co., Milwaukee, Wis.

Chinookfin—Heating Coils. Bayley Blower Co., Milwaukee, Wis.

Christie — Furnace Vacuum Cleaners. Cincinnati Sheet Metal & Roofing Co, Cincinnati, O.

Chromweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Chronat—Furnace and Boiler Repairs. National Fdry. & Furnace Co., Dayton, O.

Chronotherm — Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Circo—Louvers & Shutters. Circulators & Devices Mfg. Corp., New York City.

CirCOOLator — Fans and Ventilators. Viking Air Conditioning Corporation, Cleveland, O.

Circo-Ray—Floor Furnaces. Tennessee Enamel Mfg. Co., Nashville, Tenn.

Circulaire—Heaters. J. V. Patten Co., Sycamore, Ill.

Clamp On—Humidifier Fittings. Sallada Mfg. Co., Minneapolis, Minn.

Classic—Registers. Auer Register Co., Cleveland, O.

Cleanaire—Blower-Filters. Peerless Foundry Co., Indianapolis, Ind.

Cleveland—Furnaces. Dornback Furnace & Fdy. Co., Cleveland.

Climate-Changer — Air Conditioning Units. Trane Co., La Crosse, Wis.

Climate Maker—Furnaces, American Foundry & Furnace Co., Bloomington, Ill.

Climate Master—Oil Burning Air Conditioning Furnace. Hess Warming & Ventilating Co., Chicago, Ill.

Climator—Blower-Filter and Blower Washer Units. L. J. Mueller Furnace Co., Milwaukee.

Clincher—Conductor Fittings and Accessories. Milcor Steel Co., Milwaukee.

Clinton—Grilles. Wickwire Spencer Steel Co., New York City.

Coal Master — Stoker-fired Furnace. Round Oak Co., Dowagiac, Mich.

Cog-Belts—V-type Belts, Dayton Rubber Mfg. Co., Dayton, Ohio.

Colalloy—Light Weight Shapes, Plates. Colonial Alloys Co., Philadelphia.

Coldstream—Air Conditioning Units. Baker Ice Machine Company, Inc., Omaha, Nebr.

Colonial—Blower-Filters, Oil Burners, Furnaces, Humidifiers, Heaters, Stokers. Green Foundry & Furnace Works, Des Moines, Iowa.

Colonial—Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn.

Colonial—Registers. Auer Register Co., Cleveland, O.

Colortipt—Arc Welding Electrodes. Wilson Welder & Metals Co., Inc., New York City.

Columbus—Ventilators. F. O. Schoedinger Co., Columbus, O.

Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.

Comet—Fans. New York Blower Co., Chicago, Ill.

Comfort—Furnaces. J. B. Foote Foundry Co., Fredericktown, O.

Comfort—Furnaces. May-Fiebeger Co., Newark, Ohio.

Comfort Air—Blower-Filter Units and Humidifiers. Comfort Products Corporation, Harvey, Ill.

Comfortaire—Stokers. Hamilton Automatic Stoker Corp., Hamilton, O.

Comfortmaker—Furnaces. Joliet Heating Corp., Joliet, Ill.

Comfortrol—Blowers and Blower Units, Furnaces. Waterman-Waterbury Co., Minneapolis.

Comfortrol—Effective Temperature Control. Julien P. Friez & Sons, Baltimore.

Comfortzone—Furnaces. Michigan Tank & Furnace Corp., Detroit.

Co-Min-Co—Insulating Cement. United States Mineral Wool Co., Chicago.

Commodore—Oil Burners. R. W. Beckett Eng. Co., Eyria, O.

Compact—Blowers. Bishop & Babcock Mfg. Co., Cleveland, O.

Compact—Oil Burners. The Aldrich Co., Peoria, Ill.

Compactaire—Air Conditioning Furnaces. Glasby Mfg. Co., Inc., J. P., Bloomfield, N. J.

Condor—Belts. Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., Passaic, N. J.

Control-O-Gas—Valves. Payne Furnace & Supply Co., Beverly Hills, Cal.

Convector—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.

Coolair—Blowers, Fans. American Coolair Corp., Jacksonville, Fla.

Collerair—Air Conditioning Units. Payne Furnace & Supply Co., Beverly Hills, Cal.

Coolvent—Attic Fans. Autovent Fan & Blower Co., Chicago.

Coppercote—Copper Paint. American Coppercote, Inc., Brooklyn, N. Y.

Copperkote—Waterproofing. Cheney Co., Philadelphia.

Copperior—Sheets. Superior Sheet Steel Co., Canton, O.

Cop-R-Loy—Copper Bearing Steel Sheets. Wheeling Corrugating Co., and Wheeling Steel Corp., Wheeling, W. Va.

Corinco—Insulation. Cork Insulation Co., Inc., New York, N. Y.

Corkboard—Insulation. Armstrong Cork Co., Lancaster, Pa.

Corner Turn—Duct Turning Vanes. Waterloo Register Company, Waterloo, Ia.

Coroaire—Air Conditioning Furnaces and Heaters. Corozone Air Conditioning Corp., Cleveland, O.

Corona—Dust Separator and Collector. Clark Dust Control Company, Chicago.

Counterflow—Air Conditioning Furnaces. Western Blower Co., Seattle.

Crater—Furnaces. Dallman Supply Co., Sacramento, Cal.

Crescent—Furnaces. Green Foundry & Furnace Works, Des Moines, Iowa.

Crescent—Oil Burners. Caloroil Burner Corp., Hartford, Conn.

Crescent—Skylights, Ventilators. American Sheet Metal Works, New Orleans, La.

Crescent—Ventilators. F. Meyer & Bro., Co., Peoria, Ill.

Crimpedge—Eaves Trough, Gutters. Milcor Steel Co., Milwaukee, Wis.

Crucibleweld—Arc Welding Electrodes. Westinghouse Electric & Mfg. Co., East Pittsburgh.

Crusader—Oil Burners. Bethlehem Fdry. & Mach. Co., Bethlehem, Pa.

Crystal—Crackle Finish Paint. Hilo Varnish Corp., Brooklyn.

D

D&E—Vacuum Furnace Cleaners, Stokers, Thermostats. Dickson & Eddy, New York City.

D-Q—Furnace Vacuum Cleaners. Densmore-Quinlan Co., Kenosha, Wis.

Dailaire—Blowers and Blower Units, Furnaces. Dail Steel Products Co., Lansing, Mich.

Dakota—Oil Burners. Fargo Foundry Co., Fargo, N. D.

Daptoblu—Gas Burners. Beck Engineering Combustion Kompany, St. Louis.

Decoseal—Aluminum Paint. Debevoise Co., Brooklyn, N. Y.

Deflectairs—Duct Tuning Vanes. Pernot & Rich, Inc., Los Angeles.

Deflecto—Ventilators. The Day Co., Minneapolis, Minn.

DeLuxe—Air Conditioning Furnaces. Williamson Heater Co., Cincinnati.

DeLuxe—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

DeLuxe—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

Dens-Pac—Asbestos Cement. Norristown Magnesia & Asbestos Co., Norristown, Pa.

Dependable—Paint. Heath & Milligan Mfg. Co., Chicago, Ill.

De-Pollenizer—Window Ventilator and Filter Units. Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

Dereka—Paint. Debevoise Co., Brooklyn, N. Y.

Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit and Monroe, Mich.

Detroit UniStoker—Stokers. Detroit Stoker Co., Detroit and Monroe, Mich.

Dezert Kooler—Evaporative Type Air Conditioning Unit. Utility Fan Corp., Los Angeles.

Dial Damper—Draft Regulators. Parker-Kalon Corp., New York City.

Dial-Set—Stokers. Kol-Master Corp., Oregon, Ill.

Diamond—Compounds, Enamels, Lacquers and Paint. Thompson & Co., Pittsburgh, Pa.

Diamond—Smoke Pipe Dampers. Adams Company, The, Dubuque, Ia.

Diamond H—Controls, Relays, Switches. Hart Mfg. Co., Hartford, Conn.

Dickinson—Dampers, Scuppers, Ventilators. Aeolus Dickinson, Chicago, Ill.

Dickrope—V-type Belts. R. &. J. Dick Co., Passaic, N. J.

Directaire—Air Conditioning Furnances. Fitzgibbons Boiler Co., Inc., New York City.

Doall Metalmaster—Contour cutting saw. Continental Machine Specialties, Inc., Minneapolis.

Dorex—Odor Adsorbers. W. B. Connor Eng. Corp., New York City.

Double Diamond—Humidistats, Psychrometers, Relays, Switches, Thermometers. H-B Instrument Company, Philadelphia, Pa.

Double-Duty—Oil Burners. Aldrich Co., Peoria, Ill.

Double Radiator—Furnaces. Mueller Furnace Co., L. J., Milwaukee, Wis.

Dover—Hangers. Reeves Steel & Mfg. Co., Dover, Ohio.

Dover-Imperial—Eaves Trough Hangers. Ohio Wire Products Co., Dover, O.

Dow—Pipe. Sterling Foundry Co., Sterling, Ill.

Dowagiac—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Draftmaster—Regulators. Piatt Products Corp., Lansing, Mich.

Draft-O-Stat—Draft Regulators and Smoke Pipe Dampers. Hotstream Heater Company, Cleveland.

Draftrite—Draft Gages. Bacharach Industrial Instrument Co., Pittsburgh.

Dri-Lap—Roofing. Globe Iron Roofing & Corrugating Co., Cinicinnati, O.

Dri-N-Tite—Cement. A. C. Horn Co., Long Island City, N. Y.

Driwal—Waterproofing Compound. The Glidden Co., Cleveland.

Drou-Ve-Lite—Skylights. G. Drouve Co., Fairfield, Conn.

Dual-Air—Ventilators. General Regulator Corp., Chicago, Ill.

Dual-Clone—Blow Pipe Collectors. Day Co., Minneapolis.

Duckseal—Waterproofing Compound. Acorn Refining Co., Cleveland.

Duco—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

Ductatherm—Damper Motors. Mercoid Corp., Chicago.

Ductype—Blowers. South Bend Air Products, Inc., South Bend, Ind.

Dul-Kote—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Dulux—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

Dunco—Relays, Switches, Thermostats. Struthers Dunn, Inc., Philadelphia, Pa.

Duotherm—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

Duo-Therm—Furnaces, Heaters. Motor Wheel Corp., Lansing, Mich.

Duplex—Flashings. Chase Brass & Copper Co., Inc., Waterbury, Conn.

Dura—Furnaces, Heaters. Barry Furnace Co., Hamilton, O.

DuraBilt—Registers. Auer Register Co., Cleveland, Ohio.

Dura-A-Ble—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

Dura-Flex—Directional Flow Registers. Auer Register Co., Cleveland.

Duronze—Sheets. Bridgeport Brass Co., Bridgeport, Conn.

DuraSteel—Registers. Middleton Mfg. & Sales Co., Minneapolis.

DustStop — Filters. Owens-Corning Fiberglas Corp., Toledo, Ohio.

Dux-Bac—Shingles. Milcor Steel Co., Milwaukee, Wis.

Dux-Sulation—Duct Insulation. Grant Wilson, Inc., Chicago, Ill.

Dynaflow—Blowers. South Bend Air Products, Inc., South Bend, Ind.

E

Eagle Star—Solder. Eagle-Picher Lead Co., Cincinnati, Ohio.

Eagle Super—Insulating Cement and Flashing. Eagle-Picher Lead Co., Cincinnati, O.

Eagle Tin-Loy — Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, Ohio.

Earle—Ventilators. Berger Bros. Co., Philadelphia, Pa.

Easy—Buffers, Grinders, Polishers and Sanders. Detroit Surfacing Machine Co., Detroit.

Easy Edger—Flanging Machine. Ward Machinery Co., Chicago, Ill.

Easy-Flo—Welding Rod. Handy & Harmon, New York, N. Y.

Easy-Slip — Conductor Pipe. Eaves Trough and Gutters. La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.

Economy—Furnaces, Heaters. International Heater Co., Utica, N. Y.

Economy—Blow Pipe Hoods. Kirk & Blum Mfg. Co., Cincinnati, O.

Economy—Registers. Auer Register Co., Cleveland, O.

Econo-Therm—Registers. Middleton Mfg. & Sales Co., Minneapolis.

Edge Seal—Filters. Wilson & Co., Inc., Chicago.

Effico—Louvres, Skylights, Ventilators. W. F. Hirschman Co., Inc., Buffalo.

Elastikote—Paint. Tropical Paint & Oil Co., Cleveland, O.

El Dryol — Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Electric Filter Watchman—Air Filter Gauge. Herbusch Corp., St. Louis.

Electric Furnace Man—Domestic Stoker. General Machine Co., Inc., New York City.

Electric Janitor—Controls and Regulators. Minneapolis-Honeywell Regutor Co., Minneapolis, Minn.

Electro-Sheet—Roofing. American Brass Co., Waterbury, Conn.

Electrol-Air — Air Conditioning Furnaces. Associated Air Conditioning Corp., St. Louis, Mo.

Electro Way—Fans. Ward Mfg. Co., Detroit, Mich.

Electro-Wind—Ventilators. Allen Corp. Detroit.

El Glykol — Waterproofing Cmpound. Gerard Chemical Co., Elizabeth, N. J.

Elite—Registers. Auer Register Co., Cleveland, O.

Empire—Mallets. Greene, Tweed & Co., New York City.

Enamelite—Duct Insulation. Presstite Engineering Co., St. Louis, Mo.

Enduro—Sheets. Republic Steel Corp., Cleveland, O.

Epco—Perforated Metals. Erdle Perforating Co., Rochester, N. Y.

Equator—Furnaces and Heaters. Lennox Furnace Co., Marshalltown, Iowa.

Erco — Flanging and Shrinking Machines. Engineering and Research Corporation, Riverdale, Md.

Esio—Electric Soldering Coppers. Electric Soldering Iron Co., Inc., Deep River, Conn.

Eskimo—Coils and Water Circulating Pumps. Star Radiator Co., Los Angeles, Cal.

Esso—Oil Burners, Furnaces. Gilbert & Barker Mfg. Co., Springfield, Mass.

Eternium—Paint. Barrett Co., New York City.

Eureka—Furnaces. Home Stove Co., Indianapolis, Ind.

Evansway—Furnaces. George Evans Corp., Moline, Ill.

Evco—Valves. Electric Valve Mfg. Co., New York, N. Y.

Everdur — Plates, Sheets, Structural Shapes, Welding Rod. American Brass Co., Waterbury, Conn.

Everlast—Furnaces. Pacific Gas Radiator Co., Los Angeles, Cal.

Everwear — Metal Ceilings, Eaves Trough and Gutters with Fittings, Conductor Pipe, Ridge Rolls and Ridging, Roofing, Metal Shingles and Tile, Skylights, Ventilators. Southern States Iron Roofing Co., Savannah, Ga.

Exhaustair—Fans. New York Blower Co., Chicago.

E-Z-On—Damper Clips and Tips, and Damper Regulators. M. A. Gerett Co., Milwaukee.

F

F & E—Underfeed Stokers. Flynn & Emrich Co., Baltimore, Md.

Fabrikated—Grilles, Registers. Independent Register Co., Cleveland, O.

Falco—Sheets, Fairmont Aluminum Co., Fairmont, W. Va.

Famous—Oil Burners. Excelsior Steel Furnace Co., Chicago.

FarQuar—Furnaces. Farquhar Furnace Co., Wilmington, O.

Favorite—Furnace and Smoke Pipe Fittings and Accessories. Williamson Heater Co., Cincinnati, O.

Featherfin—Coils. L. J. Wing Mfg. Co., New York, N. Y.

F Electric—Fan Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Fenn Rotary—Roof Ventilators. Waverly Heating Supply Co., Boston.

Ferrobord — Steel Roofing. Truscon Steel Co., Youngstown, Ohio.

Ferroclad—Building Insulation. Truscon Steel Co., Youngstown, O.

Ferrocraft—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Ferro-Therm — Insulation. American Flange & Mfg. Co., Inc., New York.

Ferroweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Fiberglas — Insulation. Owens-Corning Fiberglas Corp., Toledo, Ohio.

Filteraire — Window Ventilator-filter units. Davies Air Filter Corp., New York City.

Filtered Aire — Blowers and Blower Units. American Foundry & Furnace Co., Bloomington, Ill.

Findlay—Stokers. Bluffton Mfg. Co., Findlay, O.

Fine Air—Air Conditioning Units. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Fin-Flex—Registers. The Auer Register Co., Cleveland.

Fin-Line—Registers. The Auer Register Co., Cleveland.

Firecrete—Refractories. Johns-Manville, New York, N. Y.

Firedaire — Circulating Heaters. Edwards Mfg. Co., Inc., Cincinnati.

Fireite—Cement. Johns-Manville, New York, N. Y.

Fire-King — Stokers. Sinker-Davis Co., Indianapolis, Ind.

Fire Tender—Stokers. Holcomb & Hoke Mfg. Co., Indianapolis, Ind.

Firma—Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Fitchburg—Oil Burners. E. W. Skinner Co., Fitchburg, Mass.

Fitrite—Conductor, Eaves Trough and Gutter Fittings and Accessories, Skylight Lifts, Ventilators. David Levow, New York, or Rival Strap Corp., New York City.

Fitrite—Snow Guards. David Levow, New York City.

Fitzgibbonsaire—Air Conditioning Unit. Fitzgibbons Boiler Co., New York City.

Fixit—Cement. National Mfg. Corp., Tonawanda, N. Y.

Flash-Rite—Flashings. The Figge Mfg. Co., Chicago, Ill.

Fleetweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Fleur de Lis—Conductor Heads and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Flexair—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Flexarc—Arc Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh.

Flo-Co—Furnaces. Floral City Co., Monroe, Mich.

Floezy—Solder. Merchant & Evans Co., Philadelphia, Pa.

Flor-Aire—Floor Furnaces. L. J. Mueller Furnace Co., Milwaukee.

Florence—Furnaces. Emrich Co., Inc., Columbus, Ohio.

Flosol—Flux. American Chemical Paint Co., Ambler, Pa.

Flo-Warm—Coal, Oil, Gas and Stoker-Fired Furnaces. Williamson Heater Co., Cincinnati, Ohio.

Forbes Syphonaire—Ventilators. Western Engineering & Mfg. Co., Los Angeles.

Forbes Tri-Peller—Fans. Western Engineering & Mfg. Co., Los Angeles.

Ford-V-Neer—Building Insulation. Ford Roofing Products Co., Chicago.

Forest Fleece—Insulation. John J. Doheny Co., Belmont, Mass.

Forstair Gas—Circulating Heaters. Pernot & Rich, Inc., Los Angeles.

Fosco—Metal Ceilings, Skylights, etc. F. O. Schoedinger Co., Columbus, O.

Franklin — Stokers. Columbus Metal Products, Inc., Columbus, O.

Freeflo—Grilles. Trane Co., LaCrosse, Wis.

Free-Man—Stokers. Illinois Iron & Bolt Co., Chicago, Ill.

Freeport—Oil Burners. Holtum Mfg. Co., Freeport, Ill.

Frigid—Night Air Cooling and Exhaust Fans and Fan Blades. Circulators & Devices Mfg. Corp., New York City.

Front End—Paint. Barrett Co., New York, N. Y.

Front Rank—Furnaces. Liberty Foundry Co., St. Louis, Mo.

Fros-T-aire — Air Conditioning Units. Palmer's Manufacturing Corp., Phoenix, Ariz.

Fulscope—Controls. Taylor Instrument Companies, Rochester, N. Y.

Fulton—Copper Paint. Debevoise Co., Brooklyn, N. Y.

Fulton—Register Shield with Humidifier. Patent Novelty Co., Fulton, Ill.

Fyr-feeder—Stokers. American Coal Burner Company, Chicago, Ill.

Fyre-Chek—Draft Regulators. Wisconsin Heating & Draft Control Co., Oshkosh, Wis.

Fyrite—CO_2 Analizers. Bacharach Industrial Instrument Co., Pittsburgh.

Fyr-Fly—Oil Burners. The Aldrich Co., Peoria, Ill.

G

G. B. C.—Blowers and Fans. General Blower Co., Philadelphia.

G-E—Air Conditioning Units, Oil Burners, Compressors, Controls, Soldering Coppers, Couplings, Electrodes, Fans, Flux, Furnaces, Motors, Relays, Switches, Transformers, Solenoid Valves, Welders. General Electric Co., Bloomfield, N. J., and Schenectady, N. Y.

G-M—Grilles, Louvres, Shutters, Perforated Metals, Registers, Register Shields, Metal Stampings, Ventilators. Gillian Mfg. Co., Detroit.

Gal-va-nite—Roof Cement, Waterproof ing Compounds, Paint. Ford Roofing Products Co., Chicago.

Gantz—Furnace Lighter for Coal and Coke. American Furnace Lighter Sales Co., St. Louis.

Garland—Furnaces, Heaters. Detroit-Michigan Stove Co., Detroit.

Gas-Era—Furnaces. L. J. Mueller Furnace Co., Milwaukee, Wis.

Gas King—Furnaces. J. King Kent Co., St. Louis.

Gastite — Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.

Gem—Furnaces. Robinson Furnace Co., Chicago, Ill.

Gem—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.

Gemanco—Compressors. General Machinery Co., Spokane, Wash.

Gen-Arc—Arc Welders. General Equipment Co., Wichita, Kan.

Genasco—Cement, Compounds, Flashings, Paint, Asbestos Paper, Roofing. Barber Asphalt Corp., Barber, N. J.

General—Heaters, Agricola Furnace Co., Inc., Gadsden, Ala.

GeneralAire—Fans. The Philadelphia Machinery Co., Philadelphia.

Generator—Coils. Hotstream Heater Co., Cleveland, O.

Genii—Oil Burner. Nu-Way Corp., Rock Island, Ill.

Genuine Detroit—Controls, Humidistats, Motors, Relays, Switches, Thermostats and Transformers. Detroit Lubricator Co., Detroit, Mich.

Giant—Oil Burners. Aldrich Co., Peoria, Ill.

Giant Nite—Fans, Ventilators. Russell Electric Co., Chicago, Ill.

Gibraltar—Furnaces. P. H. MaGirl Foundry & Furnace Works, Bloomington, Ill.

Gilbarco — Air Conditioning Units, Blower-Filter Units, Furnaces, and Draft Regulators. Gilbert & Barker Mfg. Co., Springfield, Mass.

Gilt Edge — Furnaces and Stokers. Schwab Furnace & Mfg. Co., Milwaukee.

Gimco—Insulation. General Insulating & Mfg. Co., St. Louis.

Globe—Eaves Trough and Gutters, Pipe, Ridge Rolls and Ridging, Roofing, Sheets, Shingles and Tile. Newport Rolling Mill Co., Newport, Ky.

Globe—Ventilators. J. M. & L. A. Osborn Co., Cleveland.

Glo-Fyr—Oil Burners. Aldrich Co., Peoria, Ill.

Glowan—Gas Burners. J. O. & C. U. Martin, San Francisco.

Gnome—Oil Burners. Aldrich Co., Peoria, Ill.

Gohi—Eaves Trough & Gutters, Pipe, Sheets, Ridge Rolls and Ridging, Roofing. Newport Rolling Mill Co., Newport, Ky.

Golden Rod—Air Conditioning Units, Fans, Window Ventilators and Wheels, Blowers. F. Jaden Mfg. Co., Inc., Hastings, Nebr.

Gordon—Gas Conversion Burners. Roberts-Gordon Appliance Corp., Buffalo.

Grand Rapids—Vacuum Furnace Cleaner. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.

Graylite—Building and Duct Insulation, Insulite Co., Minneapolis, Minn.

Greastop — Filters. Air-Maze Corp., Cleveland.

Grid—Heating and Cooling Coils. Unit Heater & Cooler Co., Wausau, Wis.

Grillometer—Direct Reading Air Velocity Meter. Detroit Air Meter Co., Detroit, Mich.

Gross-Aire—Blower Filters, Furnaces. Grossenbacher Steel Furnace & Mfg. Co., St. Louis.

Gulfsteel—Nails, Plates, Ridge Rolls and Ridging, Roofing, Sheets, Wire. Gulf States Steel Co., Birmingham, Ala.

Gurney — Furnaces. East Anaheim Sheet Metal Works, Long Beach, Cal.

H

H-B—Gas Conversion Burner. Handley Brown Heater Co., Jackson, Mich.

HairBestos—Insulation. Wilson & Co., Inc., Chicago, Ill.

Haircraft—Insulation. Wilson & Co., Inc., Chicago, Ill.

Hammerkraft—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn.

Handnib—Punches. National Machine Tool Co., Racine, Wis.

Handy—Pipe, Prefabricated Ducts and Fittings, Ventilators. F. Meyer & Bro. Co., Peoria, Ill.

Handy-Andy—Clinker Tong. Northwestern Stove Repair Co., Chicago, Ill.

Handy Change—Arc Welders. Maple Valley Mfg. Co., Mapleton, Iowa.

Happy Thought — Heaters. Pittston Stove Co., Pittston, Pa.

Hardweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Health Air—Blowers, Furnaces, Humidifiers. Economy Baler Co., Ann Arbor, Mich.

Health-Air—Window Ventilator-Filters. Ad-Lee Co., Inc., Chicago.

Health-aire—A. C. Units, Blower, Coils, Fans, Louvers and Shutters and Ventilators. Johnson Fan & Blower Corp., Chicago, Ill.

Healthmaster—Blowers, Ducts and Fittings, Furnaces, Heaters. Chandler Co., Cedar Rapids, Iowa.

Heat-Aid—Furnace Linings. Pyrolite Products Co., Cleveland, Ohio.

Heatcote—Paint. Debevoise Co., Brooklyn, N. Y.

Heatwave—Furnaces. Stephens Mfg. Co., Tulsa, Okla.

Heath Dual—Range Draft Gage. Detroit Air Meter Co., Detroit.

Heat-O-Meter—Heat Savers. Air-n-Oil Burners & Heating Utilities, Inc., Brooklyn, N. Y.

Heat-Pak—Oil Burners. Aldrich Co., Peoria, Ill.

Heatrola—Heaters. Estate Stove Co., Hamilton, O.

Heatseal—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Heat-X-Tractor—Heat Savers. Air-n-Oil Burners & Heating Utilities, Inc., Brooklyn, N. Y.

Heavyduty—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.

Heetrozone, The — Air Conditioning Units. American Air Conditioning Co., Minneapolis, Minn.

Hellite — Refractories. Johns-Manville, New York, N. Y.

Hercules—Arc Welders. Commonwealth Mfg. Corp., Cincinnati, O.

Hercules—Fan Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Hercules—Furnaces. Johnston Gas Furnace Corp., North Hollywood, Cal.

Hercules—Gravity Roof Ventilators. Berger Bros. Co., Philadelphia.

Hercules—Heavy Duty Furnace. Lennox Furnace Co., Inc., Marshalltown, Iowa.

Hercules — Gravity Roof Ventilators. Berger Brothers Company, Philadelphia.

Hero—Heaters. J. V. Patten Co., Sycamore, Ill.

Highflex—Belts. B. F. Goodrich Co., Akron, O.

Highway—Copper Iron. Apollo Steel Co., Apollo, Pa.

Hi Heat—Enamels and Lacquers, Aluminum Paint. J. H. Krehbiel Co. Chicago.

Hilume—Aluminum Paint. Hilo Varnish Corp., Brooklyn.

Hitoncast—Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Hodell—Furnace Chain. Chain Products Co., Cleveland.

Hoffman—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.

Hold Heat—Soldering Coppers. Turner Brass Works, Sycamore, Ill.

Hold-Heet—Controls, Thermostats, Transformers. Russell Electric Co., Chicago, Ill.

Holgun—Portable Electric Drills. Black & Decker Mfg. Co., Towson, Md.

Holtite-Phillips—Screws and Bolts. Continental Screw Co., New Bedford, Mass.

Home—Furnaces. Rock Island Stove Co., Rock Island, Ill.

Home Comfort—Blowers, Furnaces. St. Louis Furnace Mfg. Co., St. Louis, Mo.

Hot Blast—Soldering Furnaces and Torches. Turner Brass Works, Sycamore, Ill.

Hotco—Furnaces, Oil Burners. Hotentot Co., Inc., Omaha, Nebr.

Hot Spot—Electric Welders. Acme Electric Welder Co., Huntington Park, Cal.

Hot Wave—Coils. Rudy Furnace Co., Dowagiac, Mich.

Howle—Heat Savers. Condensation Engineering Corp., Chicago, Ill.

Hoyt—Roofing. National Lead Co., New York, N. Y.

Huber—Overfeed Stokers. Flynn & Emrich Co., Baltimore, Md.

Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.

Humidair—Humidifiers, Washers, American Foundry & Furnace Co., Bloomingtn, Ill.

Humidaire—Humidifiers. American Humidaire Corp., Grand Rapids, Mich.

Humidiguide—Hygrometer. Taylor Instrument Companies, Rochester, N. Y.

Humidostat — Humidistats. Johnson Service Co., Milwaukee, Wis.

Humitherm—Air Conditioning Units. Grinnell Co., Inc., Providence, R. I.

Humphrey—Furnaces. General Gas Light Co., Kalamazoo, Mich.

Hydronon—Concrete Waterproofing Paint. Barrett Co., New York City.

Hydro-Proof — Water-Proofing Compounds. Asphalt Products Co., Syracuse, N. Y.

Hy-Duty—Fan Bearings, Fans, Blowers, Pumps, Ventilators, Wheels. Schwitzer-Cummins Co., Indianapolis, Ind.

Hy-Power—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Hy-Power—Snips and Shears. Wiss & Sons Co., J., Newark, N. J.

Hyro—Dampers, Handles, Punches, Regulators, Soldering Coppers. Parker-Kalon Corp., New York, N. Y.

Hytemp—Insulation. Keasbey & Mattison Company, Ambler, Pa.

Hytest—Paint. National Mfg. Co., Tonawanda, N. Y.

I

IEC—Relays, Switches. Industrial Engineering Corp., Evansville, Ind.

Ice-O-Matic—Compressors. Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

Ideal—Air Conditioning Units. Norge Heating & Conditioning Div.—Borg-Warner Corp., Detroit, Mich.

Ideal—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Ideal—Roofing Nails. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Ideal (Air Cell)—Insulation. Hinde & Dauch Paper Co., Sandusky, Ohio.

Ideal King—Furnaces. Kansas City Furnace Co., Kansas City, Mo.

Ilgair—Fans. Ilg Electric Ventilating Co., Chicago, Ill.

Impact—Spray Nozzles. Cooling Tower Co., Inc., New York City.

Imperial—Hangers. Berger Bros. Co., Philadelphia, Pa.

In-Cel-Wood—Insulation. Cornell Wood Prducts Co., Chicago, Ill.

Inco—Paint. Inter-Coastal Paint Co., East St. Louis, Ill.

Inco—Welding Rod. International Nickel Co., Inc., New York City.

Independent — Furnaces. Independence Stove & Furnace Co., Independence, Mo.

Indian—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Indian—Oil Burners. Pioneer Manufacturing Co., Cedar Rapids, Ia.

IngAclad—Plates and Sheets. Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

Insaluma—Insulating Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

Ins-Lite—Building and Duct Insulation. Insulite Co., Minneapolis.

Insa-Lute—Furnace Cement. Sauereisen Cements Co., Pittsburgh, Pa.

Interlock—Pipe. Milcor Steel Co., Milwaukee, Wis.

Invisible Joint—Metal Ceilings. Milcor Steel Co., Milwaukee, Wis.

Ironite—Hot Surface Paint. Acorn Refining Co., Cleveland.

Ironset—Furnace Cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.

Ironside—Paint. Thompson & Co., Pittsburgh, Pa.

Ironton—Gas Burners, Heaters. Continental Stove Corp., Ironton, O.

Isl City—Registers. Rock Island Register Co., Rock Island, Ill.

Iso-Tem—Automatic Heat Control. Tem Products Co., Midland, Pa.

J

J-M—Insulation, Roofing. Johns-Manville, New York, N. Y.

J.M.C.—Oil Burners. Johnson Mfg. Co., Waterloo, Iowa.

Jack Frost—Insulation. Barrett Co., New York City.

Janitrol—A. C. Units, Gas Burners, Furnaces. Surface Combustion Corp., Toledo.

Jennings—Pumps. Nash Engineering Co., South Norwalk, Conn.

Jewel—Furnaces, Heaters. Detroit-Michigan Stove Co., Detroit.

Jiffee—Coils. Hotstream Heater Co., Cleveland, O.

Jointite—Insulation. Mundet Cork Corp., New York, N. Y.

Jordan Aero—Ventilators. Paul R. Jordan & Co., Inc., Indianapolis, Ind.

Jumbo—Oil Burners. The Aldrich Co., Peoria, Ill.

Juneaire—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

Juniata—Soldering Flux. Geo. W. Diener Mfg. Co., Chicago, Ill.

Junior—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

Junior-Aire—Oil-Burning Air Conditioning Furnace. Lochinvar Corp., Dearborn, Mich.

Jusrite—Ducts, Duct Fittings and Pipe. Corbman Bros., Inc., Philadelphia, Pennsylvania.

K

K-B—Damper Control. G. L. Kerentoff, Cincinnati.

KCB—Eaves Trough and Gutters, Pipe, Ridge Rolls and Ridging, Roofing and Sheets. Newport Rolling Mill Co., Newport, Ky.

K.S.V.—Ventilators. Kernchen Co., Chicago, Ill.

KableKord—Belts. L. H. Gilmer Co., Philadelphia, Pa.

Kant Klog—Nozzles. Howell Manufacturing Co., Kansas City, Mo.

Kant Krush—Roof Strainers. Grand Rapids Wire Products Co., Grand Rapids, Mich.

Karatex—Insulation. Blocksom & Company, Michigan City, Ind.

Kathabar—A. C. Units. Surface Combustion Corp., Toledo, O.

Kelsey-Bradley—Furnaces. Kelsey Heating Co., Inc., Syracuse, N. Y.

Kemick—Paint. American Chemical Paint Co., Ambler, Pa.

Ken—Flue Gas Analyzers, Controls, Thermometers and Valves. Barclay, Inc., Robert, Chicago.

Keystone—Heaters. J. V. Patten Co., Sycamore, Ill.

Keystone — Sheets. Carnegie Illinois Steel Corp., Pittsburgh, Pa.

Kimsul — Insulation. Kimberly-Clark Corp., Chicago.

Kiscozone — Ozone Apparatus. Kisco Company, Inc., St. Louis.

Kleeco—Roof Cement, Waterproofing Compounds, Paint. Geo. B. Klee Co., Cincinnati.

Kleeco Caulk—Caulking Compounds. Geo. B. Klee Co., Cincinnati.

Kleenflo — Filters. Air-Maze Corp., Cleveland.

Klixon—Controls, Switches, Humidistats, Motors, Relays, Switches, Thermostats. Spencer Thermostat Co., Attleboro, Mass.

Kitchenaire—Fans. Allen Corp., Detroit.

Knock-Out—Arc Welders, Buffers, Grinders, Polishers and Sanders. K. O. Lee & Son Co., Aberdeen, S. D.

Knox—Smoke Pipe. Waterloo Register Co., Waterloo, Ia.

Kold-Aire—Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis.

Konical—Ventilators. Milcor Steel Co., Milwaukee, Wis.

Kooler-Aire—Blower-Washer Combinations. U. S. Air Conditioning Corp., Minneapolis.

Koppax—Paint. Koppers Co., Pittsburgh, Pa.

Kor-Ner-Lok—Pittsburgh Lock Forming Machine. Binkley Mfg. Co., Warrenton, Mo.

Kristokrak — Enamels and Lacquers. Zapon-Brevolite Division Atlas Powder Co., North Chicago, Ill.

Kuehn's—Gutters, Ridge Rolls and Ridging. Milcor Steel Co., Milwaukee.

Kuehn's Airflo—Pipe Fittings. Milcor Steel Company, Milwaukee.

Kumfort Kooler—Air Conditioning Units. Hall Mfg. Co., Cedar Rapids, Ia.

L

L. A.—Motors. Louis Allis Co., Milwaukee, Wis.

L & N—Instruments. Leads & Northrup Co., Philadelphia, Pa.

L & R—Conductor Pipe. Lamb & Ritchie Co., Cambridge, Mass.

L-R—Flexible Couplings. Lovejoy Flexible Coupling Co., Chicago, Ill.

L-U—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Lakeside—Blowers. Furblo Co., Hermansville, Mich.

Lancol—Stainless Steel Soldering Flux. F. H. Langsenkamp Co., Indianapolis, Ind.

Lastik Wampum—Cement Paint. Lastik Products Co., Inc., Pittsburgh.

Lawson—Heaters. Continental Stove Corp., Ironton, O.

Leadclad—Eaves Trough and Gutters, Fittings, Ridge Rolls and Ridging, Sheets, Shingles and Tile and Wire, Wheeling Metal & Mfg. Co., Wheeling, W. Va.

Leader—Oil Burners. Pressure Oil Burners, Inc., York, Pa.

Leader—Oil Burners and Circulating Heaters. Victor Oil Burner Mfg. Co., Hortford, Conn.

Lectrik Ice—Refrigerating Compressors. Uniflow Mfg. Co., Erie, Pa.

Lectro-Glo—Circulating Heaters. Day & Night Water Heater Co., Monrovia, Cal.

Lectro-Shear—Portable Electric Shears. Black & Decker Mfg. Co., Towson, Md. and Van Dorn Electric Tool Co., The, Towson, Md.

Lehigh—Furnaces, Heaters. Pittston Stove Co., Pittston, Pa.

Leonard—Circulating Oil Heater. W. R. Ames Co., San Francisco.

LeRoy—Fan and Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Liberty—Paint. Carter Paint Co., Liberty, Ind.

Lifetime—Furnace Pipe Fittings & Accessories. Campbell Heating Co., Des Moines, Ia.

Lightweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Lima—Stokers. John R. Carnes, Inc., Lima, O.

Lincoln—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

Linc-Weld—Motors. Lincoln Electric Co., Cleveland, O.

Linseal—Furnace Cement. Buckeye Products Co., Cincinnati, Ohio.

Lipman—Air Conditioning Units, Coils, Compressors. General Refrigeration Corp., Beloit, Wis.,

Liquidelastigum—Paint. Barrett Co., New York City.

Little Blacksmith—Punches and Slitting Machines. J. F. Kidder Mfg. Co., Inc., Burlington, Vt.

Little Giant—Time Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Llemroc—Fire Doors. Cornell Iron Works, Inc., Long Island City, N. Y.

Lo-Blast—Gas Conversion Burners. National Machine Works, Chicago, Ill.

Lo-Boy—Stokers. Whiting Corp., Harvey, Ill.

Lock-Joint—Pipe and Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee.

Lok-Joint—Building Insulation. Insulite Co., Minneapolis, Minn.

Lornate—Chimney Caps & Tops, Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Luco—Acid Brushes, Compounds, Flux, Solder. Thos. F. Lukens Metal Co., Philadelphia, Pa.

Ludlite—Stainless Steel, Roofing and Sheets. Allegheny Ludlum Steel Corp., Brackenbridge, Pa.

Lumino—Paint. Koppers Co., Pittsburgh, Pa.

Lumitall—Aluminum Paint. National Mfg. Co., Tonawanda, N. Y.

Luxaire—Blower-Filters, Oil Burners, Furnaces and Humidifiers. The C. A. Olsen Manufacturing Co., Elyria, O.

Lyonore—Sheets. Lyon-Conklin & Co., Inc., Baltimore.

M

M & E—Compressors, Solder. Merchant & Evans Co., Philadelphia, Pa.

M.F.C.—Gas Floor Furnaces. Moncrief Furnace & Mfg. Co., Inc., Dallas, Tex.

M & H—Zinc Sheets. Matthiessen & Hegeler Zinc Co., LaSalle, Ill.

M & M—Humidifier Valves. McDonnell & Miller, Chicago, Ill.

M & S—Cork Insulation. Mitchell & Smith, Inc., Detroit.

M-VB—Humidifier Fittings, Valves. Scovill Mfg. Co., Morency-Van Buren Div., Sturgis, Mich.

Macheta—Fans and Fan Blades. Aerovent Fan Co., Piqua, O.

Mack—Heaters. J. V. Patten Co., Sycamore, Ill.

Majestic—Roofing, Skylights, Ventilators. W. A. Fingles, Inc., Baltimore, Md.

Manganweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Mark Time—Time Switches. M. H. Rhodes, Inc., Hartford, Conn.

Marvel—Punches. Armstrong-Blum Mfg. Co., Chicago, Ill.

Marvelaire—Furnaces. Star Radiator Co., Los Angeles.

Mascofil—Insulation. Munn and Steele, Inc., Newark, N. J.

Massachusetts—Blowers, Fans. Bishop & Babcock Mfg. Co., Cleveland, O.

Master—Controls, Motors, Thermostats. White Mfg. Co., St. Paul, Minn.

Master—Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

Master—Hangers and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Master Kraft—Oil Burners, Regulators and Heat Savers. Harvey-Whipple, Inc., Springfield, Mass.

Master Line—Soldering Torches. Turner Brass Works, Sycamore, Ill.

Master Stoker—Stokers. Muncie Gear Works, Inc., Muncie, Ind.

Mastr-Lok—Pipe Fittings. Parkersburg Iron & Steel Co., Parkersburg, W. Va.

Max-i-min—Furnaces. The Gehri Co., Tacoma, Wash.

Mayflower—Refrigerating Compressors. Hardy Mfg. Co., Dayton, O.

McIlvaine—Oil Burners. Landwehr Heating Corp., Philadelphia, Pa.

Mellow—Furnaces. Liberty Foundry Co., St. Louis, Mo.

Mellow-Aire—Furnaces. Liberty Foundry Co., St. Louis.

Mel-Rock—Ventilators and Washers. Mellish & Murray Co., Chicago.

Mercury—Soldering Coppers. Vulcan Electric Co., Lynn, Mass.

Metalbestos—Pipe and Fittings. Williams-Wallace Co., San Francisco.

Metalace—Registers. American Foundry & Furnace Co., Bloomington, Ill.

Metrotherm—Thermostats. General Controls Co., Glendale, Cal.

Meyco—Furnaces. Meyer Furnace Co., Peoria, Ill.

Microstat—Thermostats. Julien P. Friez & Sons, Baltimore.

Micro-Weld—Spot Welders. Micro Products Co., Chicago.

Midas—Spot Welders. Commonwealth Mfg. Corp., Cincinnati, O.

Midget—Bending Brake. A. R. Harris, Hammond, Ind.

Midget—Ozonizers. Corozone Air Conditioning Corp., Cleveland, O.

Midget Kooler-aire—Air Conditioning Units. U. S. Air Conditioning Corp., Minneapolis.

Miles—Blowers. Henry Furnace & Foundry Co., Cleveland.

Miles, Jr.—Propeller Furnace Fans. Henry Furnace & Foundry Co., Cleveland, O.

Milwaukee—Ventilators. Milcor Steel Co., Milwaukee, Wis.

Minnemeyer—Fittings. LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

Minute—Damper Regulator Sets. Joal Mfg. Corp., Toledo.

Mistoil—Oil Burners. Wayne Oil Burner Corp., Fort Wayne, Ind.

Mistolator—Oil Burners, Automatic Burner Corp., Chicago, Ill.

Mobilaire—Room Air Conditioning Unit. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Model—Furnaces, Heaters. Home Stove Co., Indianapolis, Ind.

Model A—Furnaces, Heaters. Williamson Heater Co., Cincinnati, O.

Moderator—Air Conditioning Units. Clarage Fan Co. Kalamazoo, Mich.

Modernair—Blower-Filter Units. Payne Furnace & Supply Co., Beverly Hills, Cal.

Modernaire—Fans. Dallas Eng. Co., Inc., Dallas, Tex.

ModernAire—Warm Air Furnaces and Repairs. Des Moines Stove Repair Co., Des Moines, Iowa.

Modern-Aire—Furnaces, Blowers. Agricola Furnace Co., Gadsden, Ala.

Moderne—Blowers, Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

Modernistic—Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Moditherm—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

Modutrol—Damper Duct Motors. Minneapolis-Honeywell Regulator Co., Minneapolis.

Moistair—Furnaces. Round Oak Co., Dowagiac, Mich.

Moistair Blended Iron—Furnaces. Round Oak Co., Dowagiac, Mich.

Moistair Boiler Plate—Furnaces. Round Oak Co., Dowagiac, Mich.

Moler—Insulation. F. L. Smidth & Co., New York City.

Monarch—Furnaces. Forest City Foundries Co., Cleveland.

Monarch—Furnaces. Kruse & Dewenter Co., Indianapolis, Ind.

Moncrief—A.C. Units, Prefabricated Ducts, Pipe Fittings and Accessories, Furnaces, Heaters. Henry Furnace & Foundry Co., Cleveland, O.

Monel—Sheets. International Nickel Co., Inc., New York City.

Monitor—Furnaces. Marshall Furnace Co., Marshall, Mich.

Monitor—Furnaces. Thiele Furnace Co., Inc., Indianapolis, Ind.

Monmouth Flortrol—Humidifier Valves. Monmouth Products Co., Cleveland.

Monmouth Humidigrad—Humidifier Valves. Monmouth Products Co., Cleveland.

Monmouth Micro-Feed—Humidifier Valves. Monmouth Products Co., Cleveland.

Monopipe—Gas Floor Furnaces. Lenox Furnace Co., Marshalltown, Ia.

Morning Air—Furnaces. Jackson Sheet Metal Wks., Ogden, Utah.

Motex—Solder. Consolidated Metals Corp., Detroit.

Moto-Heat—Oil Burners. Brigham Oil Burner Co., St. Louis, Mo.

Motopump—Water Circulating Pumps. Yeomans Bros. Co., Chicago.

Mototurb—Ventilators. Uno Ventilator Co., Cliftondale, Mass.

Muelleraire—Air Conditioning Units. L. J. Mueller Furnace Co., Milwaukee, Wis.

Multiclone—Collectors. Research Corp., New York, N. Y.

Multi-Panel—Filters. American Air Filter Co., Inc., Louisville, Ky.

Multitherm—Air Conditioning Units. Clarage Fan Co., Kalamazoo, Mich.

Multi-V—Filters. Staynew Filter Corp., Rochester, N. Y.

Multivane—Blowers. B. F. Sturtevant Co., Hyde Park, Boston.

Multi-Vane—Ventilators. Allen Corp., Detroit.

Murex—Arc Welding Electrodes. Metal & Thermit Corp., New York City.

M/W and A/C—Filters. American Air Filter Co., Inc., Louisville, Ky.

N

Nairoil—Oil Burners. National Airoil Burner Co., Philadelphia, Pa.

National—Blowers, Furnaces and Washers. P. H. Magirl Foundry & Furnace Wks., Bloomington, Ill.

National—Asbestos Cement, Insulation and Asbestos Paper. United States Gypsum Co., Chicago.

National—Furnaces, Heaters. Excelsior Stove & Mfg. Co., Quincy, Ill.

Natroco—Paint. National Mfg. Corp., Tonawanda, N. Y.

Nelson—Stokers. Heating Assurance, Inc., Spokane, Wash.

Neoprene—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

Nesbit—Furnaces. Standard Furnace & Supply Co., Omaha, Nebr.

Never Slip — Conductor Fittings. LaCrosse Steel Roofing & Corrugating Co., LaCrosse, Wis.

New American—Smoke Pipe Dampers. Griswold Mfg. Co., Erie, Pa.

Newark—Furnaces. May-Fiebeger Co., Newark, Ohio.

Newmanco—Kalamein Doors, Grilles, Registers. Newman Brothers, Inc., Cincinnati, O.

Newport—Instruments. Johnson Tool Co., Inc., East Providence, R. I.

Niagara—Furnaces. Forest City Foundries Co., Cleveland, O.

Niteair—Night Air Cooling Fans. Lau Blower Co., Dayton, Ohio.

Noel—Arc Welders. The Ideal Electric & Mfg. Co., Mansfield, O.

Nokol—Oil Burners. Petroleum Heat & Power Co., Stamford, Conn.

Non-Con-Dux — Cement, Insulation, Paper, Paste. Grant Wilson, Inc., Chicago, Ill.

Nonoize—Blowers. American Foundry & Furnace Co., Bloomington, Ill.

Non-Syphoning—Steel Roofing. Milcor Steel Co., Milwaukee.

Norblo—Blowers, Collectors, and Air Washers. Northern Blower Co., Cleveland, Ohio.

Norfolk—Blower-Filters, Furnaces, Heaters, Humidifiers. Sioux City Foundry and Boiler Co., Sioux City.

Northland—Heaters. J. V. Patten Co., Sycamore, Ill.

Northwestern—Furnaces. Western Furnaces, Inc., Tacoma, Wash.

Nor'wester—Blowers. Grand Rapids Die & Tool Co., Grand Rapids, Mich.

Norwol—Insulation. Norristown Magnesia & Asbestos Co., Norristown, Pa.

No-Sag—Register Shields. Pentecost & Craft Co., Terre Haute, Ind.

No-Streak—Registers. Rock Island Register Co., Rock Island, Ill.

Novoid—Aluminum Paint. Bases, Insulation. Cork Import Corp., New York, N. Y.

Nu-Air—Blades and Fans. Meier Electric & Machine Co., Indianapolis, Ind.

Nu-Air—Ventilators. Milcor Steel Co., Milwaukee, Wis.

Nu-Alpina—Gravity Roof Ventilators. Milcor Steel Co., Milwaukee, Wis.

Nu-Dry—Furnace Cement. Pyrolite Products Co., Cleveland, O.

Nu-Notch—Ventilators. Knowles Mushroom Ventilator Co., Montclair, N. J.

Nuroof—Roof Cement. Acorn Refining Co., Cleveland.

Nussbaum—Furnaces. American Standard Gas Products Co., Detroit.

Nusurface—Hot Surface Paint. Acorn Refining Co., Cleveland.

Nutipe—Gas Conversion Burners. Columbia Burner Company, Toledo.

Nu-Wood—Rigid Insulation. Wood Conversion Co., St. Paul.

O

Ohio Lock—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, Ohio.

Oil-Economy — Oil-Burning Air-Conditioning Furnace. International Heater Co., Utica, N. Y.

Oil-Eighty—Boiler Burner Unit. Fitzgibbons Boiler Co., Inc., New York.

Oil-Flo—Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Oilfyre—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

Oil Master—Furnaces. Round Oak Co., Dowagiac, Mich.

Oil Master Airklenzer—Air Conditioning Furnace. Round Oak Co., Dowagiac, Mich.

Oil-O-Matic—Oil Burners. Williams Oil-O-Matic Heating Corp., Bloomingington, Ill.

OK—Conductor Pipe Strainers. U. S. Cistern Filter Mfg. Co., Bloomington, Ill.

Oil-n-Aire—Oil Burners. Aldrich Co., Peoria, Ill.

Ol' Faithful—Maid-O'-Mist, Inc., Chicago.

Olympic—Furnaces. Washington Stove Works, Everett, Wash.

Open Dome—Furnaces. American Furnace & Foundry Co., Milan, Mich.

Orient—Furnaces. Thiele Furnace Co., Indianapolis, Ind.

Orsatomat—Flue Gas Analyzer. Hays Corp., Michigan City, Ind.

Oshkosh—Stokers. Leach Co., Oshkosh, Wis.

OutOWall—Registers. Rock Island Register Co., Rock Island, Ill.

Ovaltube—Gas Burners. Beck Engineering Combustion Kompany, St. Louis.

Oxweld—Welding Apparatus. Linde Air Products Co., New York, N. Y.

Ozite—Insulation. American Hair & Felt Co., Chicago.

P

P-G-R—Air Conditioning Units, Blower-Filters, Blowers, Pipe Fittings and Accessories, Registers and Valves. Pacific Gas Radiator Co., Huntington Park, Cal.

P. & H. Hansen—Arc Welders. Harnischfeger Corp., Milwaukee, Wis.

P & R—Air Conditioning Units, Furnaces and Pumps. Pernot & Rich, Inc., Los Angeles.

Pacifelt—Insulation. Pacific States Felt & Mfg. Co., Inc., San Francisco.

Pacific—Furnaces. W. W. Rosebraugh Co., Salem, Ore.

Pacific Breeze—Fans. Pryne & Co., Inc., Los Angeles, Cal.

Pacific-Everlast—Furnaces. Pacific Gas Radiator Co., Huntington Park, Cal.

Pacific Thermolator—Circulating Heaters. Pacific Gas Radiator Co., Huntington Park, Cal.

Packingless — Pumps. Chandler Co., Cedar Rapids, Ia.

Paintgrip—Sheets. American Rolling Mill Co., Middletown, Ohio.

Pakinsul—Insulation. Refractory & Insulation Corp., New York City.

Palco Wool—Insulation. Pacific Lumber Co., San Francisco, Cal.

Par—Refrigerating and Air Conditioning Compressors. Modern Equipment Corp., Defiance, Ohio.

Paramount — Flashing. Flemm Lead Company, Inc., Long Island City, N. Y.

Paramount—Flashings. Rochester Lead Works, Inc., Rochester, N. Y.

Paramount—Hollow Metal Windows. Willis Mfg. Co., Galesburg, Ill.

Paratex—Filters Blocksom & Company, Michigan City, Ind.

Parco—Skylight Lifts. Park City Cornice Works, Inc., Bridgeport, Conn.

Patterson—Roofing Clips. American Sheet Metal Works, New Orleans.

Pebble—Grilles. American Foundry & Furnace Co., Bloomington, Ill.

Pebble—Registers. Auer Register Co., Cleveland, O.

Peerless—Blowers, Collectors, Washers. New York Blower Co., Chicago, Ill.

Peerless—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.

Penn-Mont—Slate. Structural Slate Co., Pen Argyl, Pa.

Penntrol — Controls. Penn Electric Switch Co., Goshen, Ind.

Perfect—Furnaces, Humidifiers. Richardson & Boynton Co., New York.

Perfect-Fit — Metal Ceilings, Milcor Steel Co., Milwaukee, Wis.

Perfect-Lap Two-Drain—Steel Roofing. Milcor Steel Co., Milwaukee.

Permat—Filters. Davies Air Filter Corp., New York City.

Perfection—Eaves Trough Fittings and Accessories. Iwan Brothers, South Bend, Ind.

Perry—Damper Clips and Tips. Griswold Mfg. Co., Erie, Pa.

Pet—Oil Burners. Aldrich Co., Peoria, Ill.

Petro—Oil Burners. Petroleum Heat & Power Co., Stamford, Conn.

Pexto—Metal Workers' Machines and Tools. Peck, Stow & Wilcox Co., Southington, Conn.

Phoenix—Windows. Russell Co., F. C., Cleveland.

Pioneer—Oil Burners. Scott-Newcomb, Inc., St. Louis, Mo.

Plastic Elastigum—Cement. Barrett Co., New York City.

Plastic PB—Cement. Barrett Co., New York City.

Plastiklast—Roof Cement and Waterproofing Compound. Acorn Refining Co., Cleveland.

Plastikon—Glazing Compounds. B. F. Goodrich Co., Akron, O.

Plastoid—Compounds, Furnace Cement. Plastic Products Co., Detroit, Mich.

Pleasant Home—Furnaces. Peerless Foundry Co., Inc., Indianapolis, Ind.

Plexiform—Blowers. Bayley Blower Co., Milwaukee, Wis.

Plicast—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.

Plymco—Air Filters. Anderson Products, Inc., Cambridge, Mass.

Plymco—Air Filters. Plymouth Cordage Co., North Plymouth, Mass.

Polair—Air Conditioning Units. Pernot and Rich, Inc., Los Angeles.

Polar Giant—Air Conditioning Units. Giant Manufacturing Co., Council Bluffs, Iowa.

Porcelite—Tile. Columbian Enameling & Stamping Co., Inc., Terre Haute, Ind.

Portage—Furnaces. XXth Century Heating & Ventilating Co., Akron, O

Positive Arc—Arc Welders. Welding Apparatus Co., Chicago, Ill.

"Power-Flex"—Stokers. Link Belt Co., Chicago.

Powerstat—Valves. Mercoid Corp., Chicago.

Precipitron, Electrostatic — Automatic Air Filter. Westinghouse Electric & Manufacturing Co., Cleveland.

Premier—Welding Rod. American Steel & Wire Co., Chicago, Ill.

Premier—Furnace Vacuum Cleaner. Electric Vacuum Cleaner Co., Inc., Cleveland, O.

Premier—Circulating Heaters. Kleen-Heet, Inc., Chicago.

Premier—Sheets. Reeves Steel & Mfg. Co., Dover, Ohio.

Premier Automatik—Stoker-Fired Air Conditioning Furnaces. Premier Furnace Co., Dowagiac, Mich.

Premier DeLuxe—Furnaces. Premier Furnace Co., Dowagiac, Mich.

Premier Master—Furnaces. Premier Furnace Co., Dowagiac, Mich.

Premier Steel—Furnaces. Premier Furnace Co., Dowagiac, Mich.

Presstico—Furnace and Roof Cement. Presstite Engineering Co., St. Louis.

Prest-O-Lite—Soldering Coppers, Soldering Torches, Welding Equipment. Linde Air Products Co., New York, N. Y.

Prest-O-Weld—Oxy-Acetylene Welding Equipment, Torches. Linde Air Products Co., New York, N. Y.

Princo — Hygrometers, Psychrometers, Electric Relays, Thermometers and Thermostats. Precision Thermometer and Instrument Co., Philadelphia.

Protection — Soldering Furnaces and Torches. Clayton & Lambert Mfg. Co., Detroit, Mich.

Protectomotor—Filters. Staynew Filter Corp., Rochester, N. Y.

Protector—Snow Guards. David Levow, New York City.

Protectorelay—Electric Relays. Minneapolis-Honeywell Regulator Co., Minneapolis.

Protectovent—Window Ventilator and Filter Units. Staynew Filter Corp., Rochester, N. Y.

Protex—Protective Coating for Metal. Haydn F. White & Co., Cleveland.

Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.

Punkah—Louvres. Kelvin-White Co., Boston.

Purox—Oxy-Acetylene Welding Equipment and Torches. Linde Air Products Co., New York, N. Y.

Pyralox—Enamels and Lacquers. E. I. du Pont de Nemours & Co., Wilmington, Del.

Pyrobar—Roofing Tile. United States Gypsum Co., Chicago.

Pyrofelt—Building and Duct Insulation. Minfelt Insulation Co., Toledo.

Q

Q-T Ductliner—Celotex Corp., Chicago.

Quaker Burnoil—Oil Burners, Furnaces and Heaters. Quaker Mfg. Co., Chicago.

Quaker City—Eaves Trough and Gutters, Conductor Fittings and Accessories, Pipe, Ridge Rolls and Ridging. Berger Brothers Company, Philadelphia.

Quick Cleaner—Furnace Brushes. Pilley Packing & Flue Brush Mfg. Co., St. Louis, Mo.

Quiet May—Air Conditioning Furnaces, Units, Oil Burners. May Oil Burner Corp., Baltimore, Md.

"Quilt"—Insulation. Samuel Cabot, Inc., Boston.

R

R. & G.—Grilles, Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.

R & M—Fans, Motors. Robbins & Myers, Inc., Springfield, O.

R.M.C.—Burners. Rotary Mfg. Co., Los Angeles, Cal.

RPM—Roofing Steel. H. H. Robertson Co., Pittsburgh.

R-R-M — Hygrometers, Psychrometers. The Palmer Co., Cincinnati.

R-U-F—Fans and Ventilators. Reed Unit-Fans, Inc., New Orleans, La.

Race—Air Conditioning Units and Gas Furnaces. Royal Air Conditioning Equipment, Compton, Cal.

Radolite—Insulating Cement and Refactories. Pyrolite Products Co., Cleveland, Ohio.

Racine—Time Switches. Reliance Automatic Lighting Co., Racine, Wis.

Radiant Heat—Baffles. Jones Products Company, Ferndale, Mich.

Rainbow Mist—Nozzles. Peterson "Freezem" Mfg. Co., Kansas City, Mo.

Ralpo—Sheet Metal Cutters. Ralph W. Poe, Canton, Ill.

Ramco—Chimney Caps and Tops. Royal-Apex Mfg. Corp., Brooklyn.

Rawl-Drive—Hardened Masonry Nails. Rawlplug Co., Inc., New York City.

Raydant Heat—Stoker Baffles. Calesco Corporation, Lynn, Mass.

Recoy—Air Conditioning Units and Coils. Refrigeration Economics Co., Inc., Canton, O.

Red Band—Motors. Howell Electric Motors Co., Howell, Mich.

Red Devil—Furnace Cement. Pecora Paint Co., Philadelphia.

Redi—Stokers. General Machinery Co., Spokane, Wash.

Redi-Nail—Eaves Trough Hangers. Abbott Mfg. Co., Painesville, O.

Redox—Paint. Thompson & Co., Pittsburgh, Pa.

"Red-Reading-Mercury"—Thermometers. The Palmer Co., Cincinnati.

Red Spindle—Dampers. Stover Mfg. & Engine Co., Freeport, Ill.

Red Top—Insulation. United States Gypsum Co., Chicago, Ill.

Red Top—Thermostats. H-B Instrument Company, Philadelphia, Pa.

Reed—Filters. American Air Filter Co., Inc., Louisville, Ky.

Reflect-O-Cell — Insulation. Aluminum Aircell Insulation Co., Detroit.

ReFreshaire—Summerheat Co., South Bend, Ind.

Rego—Oxy-Acetylene Welding Equipment. Bastian-Blessing Co., Chicago, Ill.

Rego Rod—Arc Welding Electrodes and Gas Welding Rod. Bastian-Blessing Co., Chicago.

Reillaloy—Stove and Furnace Repairs. Pittsburgh Furnace Parts Co., Pittsburgh, Pa.

Remote Control — Grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Renu—Filters. American Air Filter Co., Inc., Louisville, Ky.

Republic—Gas Conversion Burners. Autogas Corp., Chicago, Ill.

Republic-Taylor—Terne Roofing Plates. Republic Steel Corporation, Cleveland.

Rex—Bearings, Pillow Blocks, Blower-Filter Units, Fans and Ventilators. Air Controls, Inc., Cleveland.

Rex—Furnaces. Calkins & Pearce, Columbus, O.

Rex-Airate—Fans, Ventilators. Air Controls, Inc., Cleveland, O.

Rex-Air-Pak—Blower Units. Air Controls, Inc., Cleveland, O.

Rexoil—Oil Burners, Furnaces. Reif-Rexoil, Inc., Buffalo, N. Y.

Rex Vibra-Sorbers—Vibration Eliminating Metal Hose. Chicago Metal Hose Corporation, Maywood, Ill.

Rezistal — Stainless Steels. Crucible Steel Co. of America, New York.

Rhino—Caulking and Glazing Compounds. Pecora Paint Co., Philadelphia.

Rincon-trol—Enamels and Lacquers. Roxalin Flexible Lacquer Co., Elizabeth, N. J.

Rip-pl—Enamels, Lacquers and Paints. Hilo Varnish Corp., Brooklyn.

Rival—Copper and Zinc Straps. David Levow, New York, N. Y.

Riverside—Furnaces. Rock Island Stove Co., Rock Island, Ill.

Robertsen—Ventilators. California Cornice, Steel and Supply Corp., Los Angeles.

Rocktex—Insulation. Philip Carey Co., Lockland, Cincinnati, O.

Rohaco—Blowers, Smoke Pipe Fittings and Accessories, Furnaces, Grilles, Pipe, Registers, Heat Savers. Roberts-Hamilton Co., Minneapolis.

Rollaire—Air Conditioning Furnaces. Hipoint Corp., Bellefontaine, O.

Roofkoter—Paint. Tropical Paint & Oil Co., Cleveland, O.

RoofSaver—Roofing Nails. Dickson Weatherproof Nail Co., Evanston, Ill.

Rotoblast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.

Roto-Clone—Dust Collectors. American Air Filter Co., Inc., Louisville, Ky.

Rotojet—Nozzles. Binks Mfg. Co., Chicago, Ill.

Roxaprene—Enamels and Lacquers. Roxaline Flexible Lacquer Co., Inc., Elizabeth, N. J.

Royal—Caulking Compounds, Cement, Enamels, Lacquers, Waterproofing, Paint. A. Wilhelm Co., Reading, Pa.

Royal—Furnaces. Hart & Crouse Corporation, Utica, N. Y.

Royalbestos—Furnace Cement. A. Wilhelm Co., Reading, Pa.

Royal Blue—Acid and Furnace Brushes. Schaefer Brush Mfg. Co., Milwaukee, Wis.

Rubalt—Enamels, Lacquers and Paint. Alfred Hague & Co., Inc., Brooklyn, N. Y.

Ru-ber-oid-Watson — Asbestos Cement and Insulation. The Ruberoid Co., New York City.

Rubyfluid—Solder, Soldering Flux, Tinning Compounds. Ruby Chemical Co., Columbus, O.

Rudico—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Rudisteel—Furnaces. Rudy Furnace Co., Dowagiac, Mich.

Rusco—Insulation, Ventilators. Russell Co., F. C., Cleveland.

Ryan—Oil and Gas Burners Solenoid Valves. R-S Products Corp., Philadelphia.

S

S.A.C.—Air Conditioning Units. Standard Air Conditioning, Inc., New York, N. Y.

S-C—Furnaces. Surface Combustion Corp., Toledo, O.

S-E—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

SF—Soldering Coppers, Torches, Welders and Welding Equipment. Sight Feed Generator Co., Richmond, Ind.

SF-Victor — Torches, Oxy-Acetylene Welding Equipment. Sight Feed Generator Co., Richmond, Ind.

S. I. S.—Cement. Barrett Co., New York City.

S-N—Furnaces. Scott-Newcomb, Inc., St. Louis, Mo.

Sachem—Circulating Heaters. Gilbert & Barker Mfg. Co., Springfield, Mass.

Saf-ty—Mallets. Martin Bersted Co., Chicago, Ill.

St. Louis—Stoker. Ormsby-Gray Combustion Service, Inc., St. Louis, Mo.

Salmo—Cement, Insulation, Pipe Coverings. Sall Mountain Co., Chicago, Ill.

Samco—Cement. Standard Asbestos Mfg. Co., Chicago, Ill.

Sampson—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Sanidaire—Humidifiers. U. S. Air Conditioning Corp., Minneapolis, Minn.

Sanitary—Furnaces. Thiele Furnace Co., Inc., Indianapolis, Ind.

Satincote—Insulation. Insulite Company, Minneapolis, Minn.

Satis-Fyre—Oil Burners. Shedlov Oil Burners, Inc., Minneapolis, Minn.

Sauter—Time Switches. R. W. Cramer Co., Inc., Centerbrook, Conn.

Savage—Stokers. Model Mfg. Co., Richmond, Va.

Sav-Haf—Oil Burners. Aldrich Co., Peoria, Ill.

Sav-T-Heat—Air Conditioning Furnaces. C. A. Dunham Co., Chicago, Ill.

Schmidt—Soldering Coppers, Soldering and Brazing Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.

Scroll-Pivoter—Snips and Shears. Wiss & Sons Co., J., Newark, N. J.

Scruplex—Fans and Ventilators. L. J. Wing Mfg. Co., New York, N. Y.

Seabreeze—Kitchen Exhaust Fan. Emerson Electric Mfg. Co., St. Louis, Mo.

Sealdslab — Duct Insulation. Insulite Co., Minneapolis, Minn.

Seal-Krimp—Flashing, Ridge Rolls and Ridging. American Rolling Mill Co., Middletown, Ohio.

Seal-Less—Condensing Units. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Seal of Quality—Roofing. Columbia Steel Co., San Francisco, Cal.

Seal-Tite—Roof Cement. C. Arthur Miller & Son, Elmira, N. Y.

Seamless—Furnaces. Waterman-Waterbury Co., Minneapolis, Minn.

Security—Caulking and Roofing. National Mfg. Corp., Tonawanda, N. Y.

Selectair—Air Conditioning Units and Oil Furnaces. S. T. Johnson Co., Oakland, Cal.

Self-Cleaning—Furnaces. Moore Corp., Joliet, Ill.

Selfvulc — Waterproofing Compounds, Paint. Self-Vulcanizing Rubber Co., Inc., Chicago.

Semco—Presses and Dies, Punches. Service Machine Co., Elizabeth, N. J.

Sensatherm — Thermostats. Mercoid Corp., Chicago.

Sensitrol—Electrical Relays. Weston Electrical Instrument Corp., Newark, N. J.

Series 5—Horizontal Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

70 Serviceman—Recording Thermostat. Jas. P. Marsh Corp., Chicago.

Shield-Arc—Electrodes and Welders. Lincoln Electric Co., Cleveland, O.

Shock Pads—Vibration Isolating Pads. B. T. Butterworth, Jr., New Canaan, Conn.

Shower-Proof—Paint. Calbar Paint & Varnish Co., Philadelphia, Pa.

Shur-Heat—Stokers. Air Conditioning & Stokers, Inc., St. Louis.

Silent—Furnace Blowers. Air Conditioning Equipment Co., Minneapolis.

Silent Air—Fans and Blades. Belanger Fan & Blower Co., Detroit.

Silentair—Blowers, Filters, Washers. Gehri Co., Tacoma, Wash.

Silent-Auburn—Oil Burners, Furnaces, Heaters. Auburn Burner Co., Auburn, Ind.

Silentblu—Gas Burners. Beck Engineering Combustion Kompany, St. Louis.

Silere—Fans, Aire-Foile Fan & Blower Company, Detroit, Mich.

Sil-Phos—Welding Rod. Handy & Harmon, New York, N. Y.

Silver-Krome—Aluminum Paint. Ford Roofing Products Company, Chicago.

Silver-Seal—Aluminum Paint. Asphalt Products Co., Syracuse, N. Y.

Simplex—Quadrants. Ohio Products Co., Cleveland.

Simplex—Humidifiers. Henry Kraker, Holland, Mich.

Simplex—Humidifiers. Sallada Mfg. Co., Minneapolis, Minn.

Simplex—Stoker. Stoker Products, Inc., Decatur, Ill.

Sim-trol—Smoke Pipe Draft Regulators. Simplex Mfg. Co., Fond du Lac, Wis.

Sirocco—Air Conditioning Units, Blowers, Fans, Washers, Wheels. American Blower Corp., Detroit.

Slumberette—Night Air Cooling Fan Units. Todd Air Conditioning Co., Inc., Bonner Springs, Kan.

Smootharc—Arc Welding Electrodes. Harnischfeger Corp., Milwaukee.

Smoothcote—Insulation. Insulite Company, Minneapolis.

Snaplock—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, Ohio.

Snug-Fit—Coils. Hotstream Heater Co., Cleveland, O.

Softweld—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

Solid Asphalt — Waterproofing compounds. Ford Roofing Products Co., Chicago.

Solid Comfort—May-Fiebeger Co., Newark, Ohio.

Soroco—Chimney Caps and Tops. Southbridge Roofing Co., Southbridge, Mass.

Sound - Pruf — Vibration Eliminating Bases. W. D. Fabling Co., Los Angeles, Cal.

Spando — Waterproofing. Cheney Co., Philadelphia.

Spatter Film—Arc Welding Electrodes. Lincoln Electric Co., Cleveland.

SpecO—Soldering Flux. Pfanstiehl Chemical Co., Waukegan, Ill.

Speed Clips—Spring Steel Fastenings. Tinnerman Products, Inc., Cleveland.

Spee Dee — Coils. Air Controls, Inc., Cleveland, O.

Spee-Dee-Heet—Furnace Blowers. Williamson Heater Co.. Cincinnati.

Speed Nuts—Sheet Metal Nuts. Tinnerman Products, Inc., Cleveland.

Speed-Up—Concrete Waterproofing Cement. Hilo Varnish Corp., Brooklyn.

Sphinx—Burners, Furnaces. C. L. Bryant Corp., Cleveland, O.

Sphinx, Jr.—Furnaces. C. L. Bryant Corp., Cleveland.

Spinner—Ceiling Ventilators. Milcor Steel Co., Milwaukee.

Spiralaire—Gun Type Oil Burner. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Spirodome—Spray Nozzles. Cooling Tower Co., Inc., New York City.

Spirovane—Ventilating Fans. Western Blower Co., Seattle, Wash.

Spra-Rite—Nozzles. Binks Mfg. Co., Chicago, Ill.

Spraymaker—Humidifiers. Lennox Furnace Co., Marshalltown, Iowa.

Stable-Arc — Arc Welding Electrodes, Arc Welders. Lincoln Electric Co., Cleveland, O.

Stack Heet—Heat Savers. Robert Barclay, Inc., Chicago.

Sta-Cool—Coils. Star Radiator Company, Los Angeles, Cal.

Stainweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Sta-Lock—Prefabricated Ducts and Duct Fittings. Chicago Furnace Supply Co., Chicago.

Stamco—Furnace Pipe, Fittings. Cincinnati Stamping Co., Cincinnati, O.

Standard—Furnaces. Alladdin Heating Corp., Oakland, Cal.

Standard—Furnaces. Home Furnace Co., Holland, Mich.

Standard—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.

Standard—Ventilators. Allen Corp., Detroit.

Standardair—Cooling Unit. Standard Stoker Corporation, New Albany, Ind.

Standard Topton—Furnaces. Klein Stove Co., Philadelphia.

Star—Furnaces. Arcweld Mfg. Co., Inc., Seattle, Wash.

Star—Solder. Eagle-Picher Lead Co., Cincinnati, O.

Star—Soldering Furnaces. Burgess Soldering Furnace Co., Columbus, O.

Star—Ventilators. Merchant & Evans Co., Philadelphia, Pa.

Steel-Fin—Heating Coils. New York Blower Co., Chicago.

Steelweld—Power Brakes. Cyril Bath & Co., Cleveland.

Stewart—Furnaces. Fuller-Warren Co., Milwaukee, Wis.

Stic-Tite—Cement and Insulation. Refractory & Insulation Corp., New York City.

Stokabilt—Air Conditioning Stoker Furnaces. American Foundry & Furnace Co., Bloomington, Ill.

Stok-A-Timer—Stoker Controls. Mercoid Corp., Chicago.

Stoker Economy—Stoker Furnaces. International Heater Co., Utica, N. Y.

Stoker-Ola—Stokers. Advance Appliance Co., Peoria, Ill.

Stokerator—Domestic Stokers. Northern Steel & Stoker Corp., Peoria, Ill.

Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis.

Stoker "X"—Stokers. Perfectaire Corp., Baltimore, Md.

Stokolair — Blowers and Blower-Filter Units. Schwitzer-Cummins Co., Indianapolis, Ind.

Stokol-Heat—Furnaces. Schwitzer-Cummins Company, Indianapolis, Ind.

Stokol Hydraulic—Stokers. Schwitzer-Cummins Co., Indianapolis, Ind.

Stokol Mercury — Stokers. Schwitzer-Cummins Co., Indianapolis, Ind.

Stowe—Stokers. Johnston & Jennings Co., Cleveland, O.

Streamaire—Coils. Young Radiator Co., Racine, Wis.

Streamline—Furnaces. Alladdin Heating Corp., Oakland, Cal.

Sturdybender—Metal Forming Machine. Cyril Bath & Co., Cleveland.

Success—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

Summer Comfort—Attic Fans. Air Controls, Inc., Cleveland.

Sunbeam—Air Conditioning Units and Furnaces, Blower-Filters, Oil Burners, Furnaces, Heaters and Humidifiers. American Radiator and Standard Sanitary Corp., New York City and Pittsburgh.

Sunrise—Oil Burners. Kais Sunrise Works, Detroit, Mich.

Super—Hangers and Fittings. Royal-Apex Mfg. Corp., Brooklyn, N. Y.

Super — Roof Flashing. Eagle-Picher Lead Co., Cincinnati, O.

Superair — Blower-Filter Units. The Majestic Co., Huntington, Ind.

Super Air Screws — Ventilating Fans. Marathon Electric Mfg. Corp., Wausau, Wis.

Superbrite—Aluminum Paint. Acorn Refining Co., Cleveland.

Super-Edger—Power Flanging Machine. Whitney Metal Tool Co., Rockford, Ill.

Superfex—Furnaces, Heaters. Perfection Stove Co., Cleveland.

Superfin—Furnaces. American Fdry. & Furnace Co., Bloomington, Ill.

Super Firma—Gravity Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo.

Super Heater—Heaters. Universal Utilities, Crestline, Ohio.

Superior—Furnaces. Pacific Gas Radiator Co., Huntington Park, Cal.

Superior—Blowers, Filters, Ventilators. American Foundry & Furnace Co., Bloomington, Ill.

Superior—Furnaces. Richardson & Boynton Co., New York, N. Y.

Superior—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

Super Red Streak — Furnace Vacuum Cleaners. National Super Service Co., Toledo, O.

Super Suction—Furnace Vacuum Cleaners. National Super Service Co., Toledo, O.

Super-Thermo—Stucco for refractory Maintenance (Refractory Lining Mix). Chicago Fire Brick Co., Chicago, Ill.

Super-X—Roofing Nails. Republic Steel Corporation, Cleveland.

Supreme—Furnaces. American Furnace & Foundry Co., Milan, Mich.

Supreme—Furnaces, Heaters. Agricola Furnace Co., Inc., Gadsden, Ala.

Suredrane — Roofing. Reeves Steel & Mfg. Co., Dover, Ohio.

Surelok—Furnace Pipe. Reeves Steel & Mfg. Co., Dover, Ohio.

Surety—Furnaces. St. Louis Furnace Mfg. Co., St. Louis.

Surfaceol — Waterproofing Compound. Gerard Chemical Co., Elizabeth, N. J.

Synchron—Stoker Controls, Relays, Switches. Industrial Engineering Corp., Evansville, Ind.

Syphon-Air—Ventilators. F. Meyer & Bro. Co., Peoria, Ill.

T

Tafco—Air Filters. Tuttle Air Filter Co., Inc., Louisville, Ky.

Tag—Psychometers, Humidistats, Hygrometers, Thermostats and Gas Pressure Regulating Valves. C. J. Tagliabue Mfg. Co., Brooklyn.

Tag Snapon—Thermostats. C. J. Tagliabue Mfg. Co., Brooklyn, N. Y.

Tamco—Ventilators. Tiffin Art Metal Co., Tiffin, O.

Tanco—Insulation and Paint. Thompson & Co., Pittsburgh, Pa.

Techni-vane—Duct Turning Vanes. Waterloo Register Co., Waterloo, Ia.

Technotrol—Electric Clock Thermostat. White Mfg. Co., St. Paul, Minn.

Tee Joint—Pipe Fittings and Accessories. Milcor Steel Co., Milwaukee.

Temco — Furnaces. Tennessee Enamel Mfg. Co., Nashville, Tenn.

Temlok—Insulation. Armstrong Cork Co., Lancaster, Pa.

Temperator—Air Conditioning Units. C. A. Dunham Co., Chicago.

Tempered-Aire—Furnaces. Gar Wood Industries, Inc., Detroit, Mich.

TempOstaT—Thermostats. D. & M. Mfg. Co., Midland Park, N. J.

Tempryte—Heat Insulating Windows. Truscon Steel Co., Youngstown, O.

Temtrol — Thermostats. Penn Electric Switch Co., Goshen, Ind.

Texrope—V-Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Tharco—Furnace Cement. The Armstrong Company, Detroit, Mich.

"The Pacific"—Furnaces. W. W. Rosebraugh Co., Salem, Ore.

Thermalfuel — Furnaces. Beck Engineering Combustion Kompany, St. Louis.

Thermidaire — Air Conditioning Units. E. K. Campbell Heating Co., Kansas City, Mo.

Thermix—Blow Pipe Collectors. Prat-Daniel Corporation, Port Chester, N. Y.

Thermo — Furnaces for Stoker Firing. American Furnace Co., St. Louis.

Thermo-Drip — Humidifiers. Automatic Humidifier Co., Cedar Falls, Ia.

Thermo-Flex—Registers. Middleton Mfg. & Sales Co., Minneapolis, Minn.

Thermogas—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.

Thermogrip—Soldering Coppers. Ideal Commutator Dresser Co., Sycamore, Ill.

Thermoil—Furnaces. Beck Engineering Combustion Kompany, St. Louis.

Thermolator—Heaters. Pacific Gas Radiator Co., Huntington Park, Cal.

Thermopane—Windows. Libbey-Owens-Ford Glass Co., Toledo, Ohio.

Thermopaste—Plastic Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

Thermos — Gravity Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Thermu-Drip — Humidifier. Automatic Humidifier Co., Cedar Falls, Ia.

Thor—Arc Welders. Commonwealth Mfg. Corp., Cincinnati, O.

Thor—Electric Buffers and Shears. Independent Pneumatic Tool Co., Chicago.

Thor Drill Champion — Electric Drills. Independent Pneumatic Tool Co., Chicago.

370 Special — Paints. Thompson & Co., Pittsburgh, Pa.

Threplex — Flashing. Chase Brass & Copper Co., Inc., Waterbury, Conn.

Thriftsteel—Furnaces. Round Oak Co., Dowagiac, Mich.

Throway—Filters. American Air Filter Co., Inc., Louisville, Ky.

Tik Wheat—Pipe Covering Paste. Clark Stek-O Corp., Rochester, N. Y.

Timercoid—Time Clock. Mercoid Corp., Chicago, Ill.

Timerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis.

Time-Saver—Damper Quadrants. Goese Mfg. Co., Milwaukee.

Time-Tested — Enamels and Lacquers. The Glidden Co., Cleveland.

Timetrol—Switches. Penn Electric Switch Co., Goshen, Ind.

Tin Loy — Tinning Compounds. Eagle-Picher Lead Co., Cincinnati, O.

Tinol—Compounds and Soldering Flux. American Solder & Flux Co., Philadelphia, Pa.

Titelock—Fittings and Accessories for Conductor, Eaves Trough and Gutter, Furnace Pipe, Copper Roofing, Metal Shingles and Tile. Milcor Steel Co., Milwaukee.

Tobin Bronze—Welding Rod. American Brass Co., Waterbury, Conn.

Tomb Brand—Insulation. Barrett Co., New York City.

Toncan—Plates, Ridge Rolls and Ridging, Roofing, Sheets. Republic Steel Corp., Cleveland, O.

Toolweld—Arc Welding Electrodes. Lincoln Electric Co., Clevelond, O.

Toridheet—Blower-Filters, Oil Burners. Furnaces and Regulators. Cleveland Steel Products Corp., Cleveland, O.

Torit—Soldering Torches. Bastian Blessing Co., Chicago.

Tornado — Furnace Vacuum Cleaners. Breuer Electric Mfg. Co., Chicago.

Torpedo—Skylights. Milcor Steel Co., Milwaukee, Wis.

Torrid—Soldering Furnaces and Torches. Geo. W. Diener Mfg. Co., Chicago.

Torrid Zone—Furnaces, Heaters. Lennox Furnace Co., Marshalltown, Ia.

Torrid-Zone Aire-Flo—Stoker-Fired Air Conditioning Furnace. Lennox Furnace Co., The, Marshalltown, Iowa.

Transite—Pipe and Fittings. Johns-Manville, New York City.

Trans-Lux Metallic—Enamels and Lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Transweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Triflex—Thermostatic Bimetals. General Plate Co., Attleboro, Mass.

Triple Drain—Channel Roofing. Republic Steel Corp., Cleveland, O.

Triplex—Furnaces. Home Furnace Co., Holland, Mich.

Tripl-ife—Furnaces. Williamson Heater Co., Cincinnati, O.

Tripltrol—Controls. White Mfg. Co., St. Paul, Minn.

Triumph—Furnaces. Joseph Capps, Inc., South Gate, Cal.

Trojan—Furnaces and Stokers. Auburn Burner Co., Auburn, Ind.

Tropico—Furnaces. Lennox Furnace Co., Marshalltown, Iowa.

Tropico—Humidifiers. Roberts-Hamilton Co., Minneapolis, Minn.

Tuffernell—Paint. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Tungar—Arc Welder. General Electric Co., Schenectady, N. Y.

Turret—Water Circulating Pumps. Yeomans Bros. Co., Chicago.

Twin Contact—Thermostats. Perfex Corporation, Milwaukee, Wis.

Twin-Fyre—Oil Burner. Aldrich Co., Peoria, Ill.

Twin Zephyr—Humidifier. Maid-O'-Mist, Inc., Chicago, Ill.

Tytecote—Reflective Blanket Insulation. Specialty Converters, Inc., East Braintree, Mass.

U

U.S.—Pipe Fittings and Registers. United States Register Co., Battle Creek, Mich.

USG—Roofing, United States Gypsum Co., Chicago, Ill.

USS—Roofing, Sheets. Carnegie-Illinois Steel Corp., Pitsburgh, Pa.

U. S. S. Columbia—Roofing, Sheets. Columbia Steel Co., San Francisco.

U-Loy—Sheets. Republic Steel Corp., Cleveland, O.

Uniblade — Blowers. Autovent Fan & Blower Co., Chicago, Ill.

Unicool — Air Conditioning Units and Washers. Betz Air Conditioning Corp., Kansas City, Mo.

Uni-Fin—Grilles and Warm Air Registers. Barber-Colman Co., Rockford, Ill.

Uniflex—Duct Turning Vanes. Barber-Colman Company, Rockford, Ill.

Uni-flo—Grilles and Registers. Barber-Colman Company, Rockford, Ill.

Uniloy—Stainless Steel Sheets. Universal-Cyclops Steel Corp., Bridgeville, Pa.

Unimatic—Air Filters. American Air Filter Co., Inc., Louisville, Ky.

Unipack—Blowers. American Machine Products Co., Marshalltown, Iowa.

Unishear — Portable Electric Shears. Stanley Electric Tool Div., The Stanley Works, New Britain, Conn.

Unisorb—Bases and Pads and Duct Insulation. Felters Co., Inc., Boston, Mass.

Unitaires—Air Conditioning Units for Stores. Westinghouse Electric & Mfg. Co., East Springfield, Mass.

Universal—Air Filters. Hugo Mfg. Co., Duluth, Minn.

Universal—Dial Damper. Parker-Kalon Corp., New York, N. Y.

Universal—Pillow Blocks. Randall Graphite Products Corp., Chicago, Ill.

Unxld—Damper Quadrants. Parker-Kalon Corp., New York, N. Y.

Upson—Rivets. Republic Steel Corp., Cleveland, O.

usAIRco—Air Conditioning Units, Blowers and Blower-Filter Units, Fans, Grilles, Ventilators, Washers and Blower Wheels. U. S. Air Conditioning Corp., Minneapolis.

Utilus—Kitchen Exhaust and Ventilating Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

V

"V" Crimp—Roofing. W. R. Ames Co., San Francisco, Cal.

Vacalox—Damper Regulators. Young Regulator Co., Cleveland, O.

Valley Forge—Cement. Ehret Magnesia Mfg. Co., Valley Forge, Pa.

Vaporator—Humidifiers. Rudy Furnace Co., Dowagiac, Mich.

Varipitch—Fans. Torrington Mfg. Co., Torrington, Conn.

Vee-Clip — Stainless Roof Fastening Clips. National Stainless Clip Corporation, New York City.

Velometer—Anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.

Vent-Rite—Solenoid Valves. Anderson Products, Inc., Cambridge, Mass.

Ventura—Fans, Ventilators. American Blower Corp., Detroit, Mich.

Venturi-Flo—Air Diffusers, Ceiling Ventilators. Barber-Colman Company, Rockford, Ill.

Vernalloy—Furnace Metal. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Vernois—Furnaces and Heaters. Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.

Vibracork—Bases. Armstrong Cork Co., Lancaster, Pa.

Victor—Blower-Filter Units, Furnaces, Humidifiers, Stokers. Hall-Neal Furnace Co., Indianapolis, Ind.

Victoroil—Air Conditioning Furnaces. Hall-Neal Furnace Co., Indianapolis, Ind.

Victory—Oil Burners. Caloroil Burner Corp., Hartford, Conn.

Viking—Furnaces. Familian Pipe & Supply Co., Los Angeles, Cal.

Visaflame—Oil Burner Controls. Mercoid Corp., Chicago, Ill.

Vitroliner—Vent and Flue Pipe and Fittings. Condensation Engineering Corp., Chicago.

Volcano—Chimney Caps and Tops. Iwan Brothers, South Bend, Ind.

Vortex—Furnace Vacuum Cleaners. B. F. Sturtevant Co., Hyde Park, Boston, Mass.

Vulcan—Furnaces and Heaters. J. V. Patten Co., Sycamore, Ill.

Vulcan—Stokers. Susquehanna Engineering Co., Bloomsburg, Pa.

Vulcanite—Roofing, Roofing Cement and Paint. Certain-teed Products Corp., New York, N. Y.

Vulcatex—Caulking and Glazing Compounds. A. C. Horn Co., Long Island City, N. Y.

Vulco—V-type Belts. Gates Rubber Co., Denver, Colo.

W

Wafer—Filters. American Air Filter Co., Inc., Louisville, Ky.

Walton — Filters. Research Products Corp., Madison, Wis.

Warco—Refractories. Walsh Refractories Corp., St. Louis, Mo.

Waterbase—Furnaces, Heaters. Farris Furnace Co., Springfield, Ill.

Water-Boy—Humidifier Valves. Maid-O'-Mist, Inc., Chicago, Ill.

Waterbury—Oil Burners, Pipe Fittings and Accessories, Furnaces and Heaters. Waterman-Waterbury Co., Minneapolis, Minn.

Waterseal—Cement. Thompson & Co., Pittsburgh, Pa.

Watertender—Humidifier Valve. J. L. Skuttle Co., Detroit, Mich.

Wearweld — Arc Welding Electrodes. Lincoln Electric Co., Cleveland, O.

Wearwell — Paint. Thompson & Co., Pittsburgh, Pa.

Weathermaker—Air Conditioning Units. Carrier Corp., Syracuse, N. Y.

Weathermaster—Air Conditioning Units, Boiler Type. Carrier Corp., Syracuse, N. Y.

Weather Master — Air Conditioning Units. U. S. Pressed Steel Products Co., Kalamazoo, Mich.

Weather Master—Stokers. Kol-Master Corporation, Oregon, Ill.

Weather Stabilizer—Furnaces, Heaters. Des Moines Steel Furnace Co., Des Moines, Ia.

Weatherwood—Insulation. United States Gypsum Co., Chicago, Ill.

Webster—Spray Nozzles and Air Washers. W. J. Strandwitz & Co., Inc., Camden, N. J.

Wedgbelt—Pulleys. American Pulley Co., Philadelphia, Pa.

Weir—Air Conditioning Furnaces, Gravity Furnaces, Heaters, Humidifiers, Stokers. Meyer Furnace Co., Peoria, Ill.

Weisco—Skylight Lifts. H. Weiss & Co., New York, N. Y.

Weldit—Torches, Oxy-Acetylene Welding Equipment. Welding Apparatus Co., Chicago, Ill.

Weldon—Wood Burning Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Weld-o-trol—Spot Welders. Westinghouse Electric & Mfg. Co., East Pittsburgh.

Weld-O-Tron—Arc Welders. Allis-Chalmers Mfg. Co., Milwaukee.

Wellsville Savage—Fire Brick. Chicago Fire Brick Co., Chicago, Ill.

Wesco—Furnaces. John Westwick & Son, Inc., Galena, Ill.

Wesco—Furnaces. Woods-Evertz Stove Co., Springfield, Mo.

Westco—Pumps. Micro-Westco, Inc., Bettendorf, Ia.

Western Fan — Roof Fan Ventilators. Western Engineering & Mfg. Co., Los Angeles.

Western King—Furnaces. Independence Stove & Furnace Co., Independence, Mo.

Westrite—Furnaces. Western Furnaces, Inc., Tacoma, Wash.

Whirlator—Oil Burners. Norge Heating & Conditioning Div., Borg-Warner Corp., Detroit, Mich.

Whitney-JENSEN—Power Brakes. Whitney Metal Tool Co., Rockford, Ill.

Wiechert—Furnaces, Heaters. St. Clair Foundry Corp., Centralia, Ill.

Wildergloss—Smoke Pipe and Fittings. Wilder Mfg. Co., Niles, Ohio.

Wilson—Furnace Brushes. Worcester Brush & Scraper Co., Worcester, Mass.

Winair—Fans. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Wind Electric—Roof Ventilators. W. F. Hirschman Co., Inc., Buffalo, N. Y.

Wind-O-Vane Jr.—Kitchen Exhaust Fans. B. F. Sturtevant Co., Hyde Park, Mass.

Windowstat—Condensation Control. Julien P. Friez & Sons, Baltimore.

Winkler—Fans and Stokers. U. S. Machine Corporation, Lebanon, Ind.

Winner—Registers. Auer Register Co., Cleveland, O.

Winter-Chaser — Furnaces, Heaters. Campbell Heating Co., Des Moines, Ia.

Winter King — Furnaces. McPherson Furnace & Supply Co., Portland, Ore.

Wissco—Grilles. Wickwire Spencer Steel Co., New York City.

Wizard—Furnaces. Agricola Furnace Co., Inc., Gadsden, Ala.

Wolverine—Fans, Blades, Ventilators and Washers. Belanger Fan & Blower Co., Detroit.

Wolverine—Furnaces. Marshall Furnace Co., Marshall, Mich.

World — Caulking Compounds. Ford Roofing Products Co., Chicago.

X

XL—Metal Windows. Herrmann & Grace Co., Brooklyn, N. Y.

X-L-All—Coils, Furnaces. Deshler Foundry & Machine Works, Deshler, O.

Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Y

Yager's—Flux. Alex R. Benson Co., Inc., Hudson, N. Y.

Yankee—Damper Clips and Tips. S. M. Howes Co., Charlestown, Boston.

Yoloy—Alloy Plates and Sheets. Youngstown Sheet & Tube Co., Youngstown, O.

Z

Zeph-Oil-Ator—Air Conditioning Furnaces. Century Engineering Corp., Cedar Rapids, Ia.

Zephyr—A. C. Stoker Furnace. Premier Furnace Co., Dowagiac, Mich.

Zephyr-aire—Fans. Gas City Glass Co., Gas City, Ind.

Zero—Furnace and Insulating Cement and Refractories. Standard Fuel Engineering Co., Detroit, Mich.

Zilloy—Zinc Roofing. New Jersey Zinc Sales Co., New York City.

Zinogrip—Steel Sheets. American Rolling Mill Co., Middletown, O.

Zincoat—Sheets. Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Zone King—A. C. Furnaces. Century Eng. Corp., Cedar Rapids, Ia.

Zone Queen—Gravity Furnaces. Century Eng. Corp., Cedar Rapids, Ia.

Zonolite—Insulation. Munn and Steele, Inc., Newark, N. J.

Z-Ro King—Furnaces. Oakland Foundry Co., Belleville, Ill.

Section of

American Artisan

1940 DIRECTORY OF WARM AIR HEATING, RESIDENTIAL AIR CONDITIONING AND SHEET METAL PRODUCTS

[Section 3—MANUFACTURERS' ADDRESSES]

A

●A-C Mfg. Co., Inc., 417 Sherman Ave., Pontiac, Ill.
Abbott Mfg. Co., Box 150, Painesville, O.
●Accurate Mfg. Works, 2336-38 Milwaukee Ave., Chicago, Ill.
Accurate Metal Weather Strip Co., 216 E. 26th St., New York City.
Ace Engineering Co., 1735 W. 31st St., Chicago, Ill.
Acer & Whedon, Inc., Commercial St., Medina, N. Y.
Acme Asbestos Covering & Flooring Co., 222 Elizabeth St., Chicago, Ill.
Acme Electric Welder Co., 5619 Pacific Blvd., Huntington Park, Cal.
Acme Heating & Ventilating Co., 4224 S. Lowe Ave., Chicago, Ill.
Acme Industries, Inc., Cor. Mechanic & Ganson Sts., Jackson, Mich.
Acme Oil Burner Co., Inc., 210 Third Ave., S. W., Cedar Rapids, Ia.
Acme Refining Co., W. 56th & W&LE Ry., Cleveland, O.
Acme Tin Plate & Roofing Supply Co., 10th & York St., Philadelphia, Pa.
Acorn Refining Co., 8001 Franklin Blvd., Cleveland, Ohio.
Adams Co., The, East 4th St. Ext., Dubuque, Ia.
Adams Mfg. Co., J. D., 217 S. Belmont Ave., Indianapolis, Ind.
Adjustable Bearing Plate Co., 11 Rutger St., St. Louis, Mo.
Ad-Lee Co, Inc., 825 S. Wabash Ave., Chicago, Ill.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago, Ill.
●Advance Appliance Co., 808-810 Washington St., Peoria, Ill.
Advance Electric Co., 1260 W. 2nd St., Los Angeles, Cal.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
Advance Insulating Co., Magee Bldg., Pittsburgh, Pa.
Aeolus Dickinson, 3332-52 S. Artesian Ave., Chicago, Ill.
Aerofin Corp., 410 S. Geddes St., Syracuse, N. Y.
Aeroil Burner Co., Inc., Park Ave. at 13th St., West New York, N. J.
Aerovent Fan Co., 710 E. Ash St., Piqua, O.
Agnew Electric Welder Co., Milford, Mich.
Agricola Furnace Co., Inc., North 12th St., Gadsden, Ala.
Ahlberg Bearing Co., 3025 W. 47th St., Chicago, Ill.
Air Conditioning Equip. Co., P. O. Box 1123, Minneapolis.
Air Conditioning Products Co., 1230 Eighteenth St., Detroit.
Air Conditioning & Stokers, Inc., 1610 Tower Grove Ave., St. Louis.
Air Conditioning Utilities Co., 8 W. 40th St., New York City.
●Air Controls, Inc., 9205 Detroit Ave., Cleveland, O.
●Air Control Products, Inc., Glade St. at Larch, Muskegon, Mich.
Aircraft Mfg. Co., 418 E. First St., Dayton, Ohio.
Air Filter Engineering Co., 2236 S. Wabash Ave., Chicago.
Air Filter Service Co., 1906 W. Fulton St., Chicago.
Aire-Foile Fan & Blower Co., 4737 W. Vernor Highway, Detroit, Mich.
AireOzone Corporation, 105 W. Madison St., Chicago.
Airgard Manufacturing Co., 609 N. La Salle St., Chicago, Ill.
Airmaster Corp., 4317 Ravenswood Ave., Chicago.
●Air-Maze Corp., 5200 Harvard Ave., Cleveland, O.
Air-n-Oil Burners and Heating Utilities, Inc., 449 Senator St., Brooklyn, N. Y.
Air-O-Cell Industries, Inc., 11616 Cloverdale Ave., Detroit.
Air-O-Line Co., The, 2118 Griffin St., Dallas, Tex.
Air Reduction Sales Co., 60 E. 42nd St., New York City.
Air Steam Filter Corp., 2100 Washington Ave., St. Louis.
Air & Refrigeration Corp., 11 W. 42nd St., New York City.
●Airtemp Div. Chrysler Corp., Leo St., Dayton, Ohio.
Airtherm Mfg. Co., 700 S. Spring Ave., St. Louis.
Ajax Flexible Coupling Co., Westfield, N. Y.
Alco Manufacturing Co., 2619 Milam St., Houston, Tex.
Alco Valve Co., 2628 Big Bend Blvd., St. Louis, Mo.
●Aldrich Co., 106 Hamilton St., Peoria, Ill.
Aldrich Pump Co., Foot of Pine St., Allentown, Pa.
Alfol Insulation Co., Inc., 155 E. 44th St., New York City.
Alladdin Heating Corp., 2222 San Pablo Ave., Oakland, Cal.
Allegheny Ludlum Steel Corp., Brackenridge, Pa.
Allen Billmyre Corp., 136 Water St., South Norwalk, Conn.
Allen-Bradley Co., 1335 S. First St., Milwaukee, Wis.
Allen Co., L. B., 6719 Bryn Mawr Ave., Chicago, Ill.
●Allen Corp., 9752 Erwin, Detroit, Mich.
Allis-Chalmers Manufacturing Company, Milwaukee.
Allis Co., Louis, 427 E. Stewart St., Milwaukee, Wis.
Allmetal Weatherstrip Co., 229 W. Illinois St., Chicago, Ill.
All States Roofers Equipment & Material Co., 2107 W. Lake St., Chicago, Ill.
Alpha Metal & Rolling Mills, Inc., 373 Hudson Ave., Brooklyn, N. Y.
Alter-Arc Mfg. Co., 209 B St., Lawton, Okla.
Alton Mineral Wool Insulation Co., P. O. Box 268, Alton, Ill.
Aluminum Aircell Insulation Co., 415 Curtis Bldg., Detroit.
Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh.
American Agile Corporation, 5806 Hough Ave., Cleveland.
American Air Conditioning Co., 2831 Thirteenth Ave., Minneapolis, Minn.
American Air Conditioning Corp., P. O. Box 29, Sebastopol, Cal.
●American Air Filter Co., Inc., 113 Central Ave., Louisville, Ky.
American Barlock Co., Inc., 36-32 38th St., Long Island City, N. Y.
American Blower Corp., 6000 Russell St., Detroit, Mich.
●American Brass Co., 414 Meadow St., Waterbury, Conn.
American Cabinet Hardware Corp., Rockford, Ill.
American Chemical Paint Co., Brookside Ave., Ambler, Pa.
American Chain & Cable Co., Inc., 929 Connecticut Ave., Bridgeport, Conn.
American Coal Burner Co., 155 E. Superior St., Chicago, Ill.
American Coils, Inc., 25-27 Lexington St., Newark, N. J.
American Coolair Corp., 3604 Mayflower St., Jacksonville, Fla.
American Coppercote, Inc., 189 Montague St., Brooklyn, N. Y.
American Emblem Co., P. O. Box 116V, Utica, N. Y.
American Flange & Mfg. Co., Inc., 1901 RCA Bldg., Radio City, New York City.
American Flexible Coupling Co., 1801 Pittsburgh Ave., Erie, Pa.
American Foundry Equipment Co., 619 Byrkit St., Mishawaka, Ind.
●American Foundry & Furnace Co., 915 E. Washington St., Bloomington, Ill.
American Furnace Co., 2719-31 Delmar Blvd., St. Louis, Mo.
American Furnace & Foundry Co., Milan, Mich.
American Furnace Lighter Sales Company, 4541 Delmar Blvd., St. Louis.
American Hair & Felt Co., 222 N. Bank Dr., Chicago, Ill.
American Humidaire Corp., 951 Cherry St., S. E., Grand Rapids, Mich.
American Hydrozone Co., Inc., 500 Garfield Ave., Jersey City, N. J.
American Instrument Co., Silver Spring, Md.
American Insulator Corp., New Freedom, Pa.
American-Larson Ventilating Co., 1004 Keystone Bank Bldg., Pittsburgh, Pa.
American Machine Products Co., 207-11 Market St., Marshalltown, Ia.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., 67 Jewelry St., Waterbury, Conn.
American Metal Weather Strip Co., 144 N. Division Ave., Grand Rapids, Mich.
American Nickeloid Co., 1505 Second St., Peru, Ill.
American Pulley Co., 4200 Wissahickon Ave., Philadelphia.
●American Radiator & Standard Sanitary Corp., 40 W. 40th St., New York City, and P. O. Box 1226, Pittsburgh.
●American Rolling Mill Co., 703 Curtis St., Middletown, O.
American Screw Co., 21 Stevens St., Providence, R. I.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Solder & Flux Co., 4519 Wayne Ave., Philadelphia, Pa.
American Standard Gas Products Co., 11720 Cloverdale Ave., Detroit.
American Steel & Wire Co., 208 S. La Salle St., Chicago, Ill.
American Warming & Ventilating Co., 1017 Summit St., Toledo, O.
American Welding & Engineering Corp., 514 N. 9th St., Milwaukee, Wis.
American Wood Register Co., Novelty & Walnut Sts., Plymouth, Ind.
American Zinc Products Co., Greencastle, Ind.

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Ames Co., W. R., 150 Hooper St., San Francisco, Cal.
Amirton Co., 60 E. 42nd St., New York City.
Anchor Stove and Range Co., Third & Culbertson, New Albany, Ind.
Anderson Mfg. Co., 511 3rd, Des Moines, Ia.
Anderson Products, Inc., 17 Tudor St., Cambridge, Mass.
Andes Range & Furnace Corp., 117 Evans St., Geneva, N. Y.
Andrews Lead Co., Inc., 30-48 Greenpoint Ave., Long Island City, N. Y.
Anemostat Corporation of America, 10 East 39th St., New York City.
Angell Nail & Chaplet Co., 4580 E. 71st St., Cleveland, O.
Annis Air Filters, 1515 Gardena Ave., Glendale, Cal.
Anti-Corrosive Metal Products Co., Inc., P. O. Box 788, Albany, N. Y.
Antigo Building Supply Co., Antigo, Wis.
Apex Rotarex Corp., 1070 E. 152nd St., Cleveland, Ohio.
Apollo Metal Works, 66th & S. Oak Park Ave., Clearing Sta., Chicago.
Apollo Steel Co., 609-617 Warren Ave., Apollo, Pa.
Arcos Corp., 401 N. Broad St., Philadelphia, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave. W., Seattle, Wash.
Arex Co., 333 N. Michigan Ave., Chicago, Ill.
Armstrong-Blum Mfg. Co., 5700 Bloomingdale Rd., Chicago.
●Armstrong Co., South & Post St., Detroit, Mich.
Armstrong Cork Co., 992 Concord St., Lancaster, Pa.
●Armstrong Furnace Co., 1649 Olentangy River Rd., Columbus, O.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Asphalt Products Co., Eastwood Sta., Syracuse, N. Y.
Associated Heater Parts Co., 3101 Wentworth Ave., Chicago.
●Atcheson Glass Co., T. J., 955 Main St., Buffalo, N. Y.
Athens Plow Co., Athens, Tenn.
Atkins & Co., E. C., 1939 Dallas St., Indianapolis, Ind.
Atlantic Metal Hose Co, Inc., 123 W. 64th St., New York City.
Atlas Asbestos Co., Ltd., 110 McGill St., Montreal, Canada.
Atlas Bolt & Screw Co., 1130 Ivanhoe Rd., Cleveland, O.
Atlas Heating & Ventilating Co., Ltd., 557 4th St., San Francisco, Cal.
Atlas Valve Co., 282 South St., Newark, N. J.
Auburn Burner Company, Auburn, Ind.
Auburn Stoker Co., Auburn, Ind.
●Auer Register Co., 3608 Payne Ave., Cleveland, O.
Au-Temp-Co Corp., 1 Park Ave., New York City.
Autocrat Oil Burner Corp., 100 East Ave., N. W., Cedar Rapids, Ia.
Autoforce Ventilating Systems, 53 Devonshire St., Boston.
Autogas Corporation, 2258 Diversey Ave., Chicago.
Auto-Heat Corporation, 311 W. 66th St., New York City.
Automatic Burner Corp., 1823 Carroll Ave., Chicago, Ill.
Automatic Gasflux Co., 700 Public Square Bldg., Cleveland.
●Automatic Humidifier Co., 19th & Main Sts., Cedar Falls, Ia.
Automatic Products Co., 2450 N. 32nd St., Milwaukee, Wis.
Automatic Pump & Softener Corp., Rockford, Ill.
Automatic Stoker Corp., Indianapolis, Ind.
Automatic Stoker Corp., 2427 W. North Ave., Milwaukee, Wis.
Automatic Temperature Control Co., Inc., 34 E. Logan St., Philadelphia.
Automatic Switch Co., 41 E. 11th St., New York City.
Autovent Fan & Blower Co., 1807-19 N. Kostner Ave., Chicago, Ill.

B

Babcock & Wilcox Co., 85 Liberty St., New York City.
Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh, Pa.
Bache & Co., Semon, Greenwich & Morton Sts., New York City.
Badger Mfg. Co., 106 N. Frances St., Madison, Wis.
Badger Mfg. & Sales Co., 743 N. 4th St., Milwaukee, Wis.
Baer Brothers, 438 W. 37th St., New York City.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland, O.
Baker Furnace & Cleaner Mfg. Co., 2505 Albion St., Toledo, O.
Baker Ice Machine Co., Inc., 1509 Evans St., Omaha, Nebr.
Baldor Electric Co., 4358 Duncan Ave., St. Louis, Mo.
Baldwin-Hill Company, 527 Klagg Ave., Trenton, N. J.
Ballantyne Co., 219 N. 16th St., Omaha, Nebr.
Balloffett Dies & Nozzle Co., Inc., 45-51 Adams St., Guttenberg, N. J.
Banner Repair Parts Co., 103 E. Indianola Ave., Youngstown, Ohio.
Barber Asphalt Corporation, Barber, N. J.
●Barber-Colman Co., River & Loomis Sts., Rockford, Ill.
●Barber Gas Burner Co., 3704 Superior Ave., Cleveland, O.
Barclay, Inc., Robt., 128 N. Peoria St., Chicago, Ill.
Bard Mfg. Co., Evansport Road, Bryan, Ohio.
Bardes Range & Foundry Co., E. H., 2619 Colerain Ave., Cincinnati, O.
Barium Stainless Steel Corp., 1502 Allen Ave., S. E., Canton, O.
Barland Weatherstrip Material Co., 5600 Curtis Ave., Cleveland, O.
Barnes Metal Products Co., 4425 W. 16th St., Chicago, Ill.
Barnes, W. O., 1297 Terminal Ave., Detroit.
Barrett Co., 40 Rector St., New York City.
Barrett Engineers, 1322 Warrensville Center Rd., Cleveland Heights, O.
Barry Furnace Co., 208 N. B. St., Hamilton, O.
Bartlett Hayward Co., 200 Scott St., Baltimore.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit, Mich.
Bastian-Blessing Co., 240 E. Ontario St., Chicago, Ill.
Bath & Co., Cyril, E. 70th & Machinery Ave., Cleveland.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bayer Co., A. J., Slauson & Santa Fe Aves., Los Angeles.
Bayley Blower Co., 1817 S. 66th St., Milwaukee, Wis.
Beacon-Morris Corp., 702 Beacon St., Boston, Mass.
●Bead Chain Mfg. Co., 110 Mountain Grove St., Bridgeport, Conn.
Bearing Co. of America, Lancaster, Pa.
Beatrice Steel Tank Mfg. Co., 700 S. 7th St., Beatrice, Nebr.
Beatty Machine & Mfg. Co., 932 150th St., Hammond, Ind.
Beck Engineering Combustion Kompany, 3033 Adams St., St. Louis, Mo.
●Beckett Engineering Co., R. W., Elyria, Ohio.
Beckley Perforating Co., 315 North Ave., Garwood, N. J.
Bedard Mfg. Co., 1647 Hennepin Ave., Minneapolis, Minn.
Belanger Fan & Blower Co., 1230 18th St., Detroit.
Belco Exhaust Fan Mfg. Co., 3810 Olive St., St. Louis.
Belfield Co., H., 435 N. Broad St., Philadelphia.
Bell & Gossett Co., 3000 Wallace St., Chicago, Ill.
Belmont Smelting & Refining Works, Inc., 341 Belmont Ave., Brooklyn, N. Y.
Bender Warrick Corp., 131 Pierce, Birmingham, Mich.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis.
Benjamin Elec. Mfg. Co., Des Plaines, Ill.
Bennett Company, 1109 Harney St., Omaha, Nebr.
Benson Co., Inc., Alex R., 1040 S. Bay Rd., Hudson, N. Y.
●Berger Bros. Co., 229-237 Arch St., Philadelphia, Pa.
Berger Mfg. Div. of Republic Steel Corp., 1038 Belden Ave., N. E., Canton, O.
Bergstrom Mfg. Corp., Neenah, Wis.
Berns Specialty Company, 1015 W. Lake St., Chicago, Ill.
Bernz Co., Inc., Otto, 280 Lyell Ave., Rochester, N. Y.
Berry, Jr., F. E. & Co., Inc., Spring St., Everett, Mass.
Berryman Oil Burner Co., 1304 Washington Blvd., Chicago.
Bersted Co., Martin, 341 N. Crawford Ave., Chicago.
Bertram Mfg. Co., 230 E. Ohio St., Chicago, Ill.
Bertsch & Co., Church St., Cambridge City, Ind.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee, Wis.
Bethlehem Foundry & Machine Co., Brodhead Ave. & Second St., Bethlehem, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Betz Air Conditioning Corp., 1820 Wyandotte, Kansas City, Mo.
Beverly Throatless Shear Co., 3009 W. 110th Pl., Chicago.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee, Wis.
Bignall Co., 621-623 Main St., Medina, N. Y.
Binkley Mfg. Co., Warrenton, Mo.
Binks Mfg. Co., 3114 Carroll Ave., Chicago, Ill.
Bird & Son, Inc., 163 Washington St., East Walpole, Mass.
Birmingham Fan Mfg. Co., Birmingham, Ala.
Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland.
Bishop Humidifier Co., 8011 Dexter Blvd., Detroit, Mich.
Bittner Engineering Co., 18-32 E. 135th St., New York City.
Black & Decker Mfg. Co., Pennsylvania Ave., Towson, Md.
Blake & Johnson Co., Waterville, Conn.
Bliss Co., E. W., 1420 Hastings St., Toledo, O.
●Blocksom & Company, East Fifth St., Michigan City, Ind.
Blood Brothers, Allegan, Mich.
Bluffton Mfg. Co., 433 W. Main Cross St., Findlay, O.
Blower Application Company, 918 N. Fourth St., Milwaukee.
Bodine Electric Co., 2272 W. Ohio St., Chicago, Ill.
Bohn Aluminum & Brass, Michigan Ave. & Shelby St., Detroit, Mich.
Bollaert, M., 3936 Rhoda Ave., Oakland, Cal.
Bossert Company, Inc., 1002 Oswego St., Utica, N. Y.
Boston Gear Wks., Inc., North Quincy, Mass.
Boyd & Co., Inc., Chas. P., Tasker & Water Sts., Philadelphia, Pa.
Braden Engineering, Inc., 896 Elmwood Ave., Providence, R. I.
Braden Mfg. Co., 431 N. 14th St., Terre Haute, Ind.
Brasco Manufacturing Co., Harvey, Ill.
●Brauer Supply Co., A. G., 2100 Washington Ave., St. Louis.
●Bremil Mfg. Co., Box 1030, Erie, Pa.
●Breuer Electric Mfg. Co., 5100 N. Ravenswood Ave., Chicago, Ill.
Bridesburg Foundry Co., Tacony & Duncan Sts., Philadelphia, Pa.
Bridgeport Brass Co., E. Main St., Bridgeport, Conn.
Bridgeport Chain & Mfg. Co., 964 Crescent Ave., Bridgeport, Conn.
Bridgeport Screw Co., Bridgeport, Conn.
Brigham Oil Burner Co., 3745 Forest Park Blvd., St. Louis.
Brillion Furnace Co., Brillion, Wis.
Bristol Co., Platts Bridge, Waterbury, Conn.
Brooklyn Metal Ceiling Co., 283-89 Greene Ave., Brooklyn, N. Y.
Bros Boiler & Mfg. Co., Wm., Nicollet Island, Minneapolis.
Brown-Brockmeyer Co., Inc., 1098 Smithville Rd., Dayton, O.
Brown Instrument Co., Div. Minneapolis-Honeywell Regulator Co., 4443 Wayne Ave., Philadelphia.
Brownell Co., N. Findlay St., Dayton, O.
Browning Mfg. Co., Inc., Maysville, Ky.
Brumme Mfg. Co., 314 S. Artesian Ave., Chicago, Ill.
Brundage Co., 510 N. Park St., Kalamazoo, Mich.
Brunner Mfg. Co., 1821 Broad St., Utica, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Corp., C. L., 4610 St. Clair Ave., Cleveland, O.
Bryant Heater Co., 17825 St. Clair Ave., Cleveland, O.
Bubar, Hudson H., 15 Park Row, New York City.
Buckeye Portable Tool Co., 25 Apple St., Dayton, O.
Buckeye Products Co., 7024 Vine St., Cincinnati, O.

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Budke Stamping Co., P. O. Box 71, Canonsburg, Pa.
Buffalo Forge Co., 497 Broadway, Buffalo, N. Y.
Buffalo Pumps, Inc., 171 Mortimer St., Buffalo, N. Y.
Builders Iron Foundry, 11 Codding St., Providence, R. I.
Burdett Mfg. Co., 19 N. Sheldon St., Chicago, Ill.
Burgess Battery Co., 500 W. Huron St., Chicago, Ill.
Burgess Soldering Furnace Co., 292 E. Long St., Columbus, O.
Burke Electric Co., 1201 W. 12th St., Erie, Pa.
Burke Stoker & Mfg. Co., 921 W. 19th St., Chicago.
Burmester Gas Furnace Mfg. Co., 2117 Cuming St., Omaha, Nebr.
Burnham Boiler Corp., 1 Main St., Irvington, N. Y.
Burnham Stoker Co., 505 Columbia St., Vancouver, Wash.
Burnley Battery & Mfg. Co., Clay St., North East, Pa.
Burnwell Corp., 125 N. Church St., Allentown, Pa.
Burrowes Corp., 70 Free St., Portland, Maine.
Burt Mfg. Co., 301 Main St., Akron, Ohio.
Bush Mfg. Co., 100 Wellington St., Hartford, Conn.
Butler Mfg. Co., 13th & Eastern, Kansas City, Mo.
Butler Street Fdry. & Iron Co., 3422 Normal Ave., Chicago.
Butterworth, Jr., B. T., Oak Street, New Canaan, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh, Pa.

C

Cabot, Inc., Samuel, 141 Milk St., Boston, Mass.
Calbar Paint & Varnish Co., 2620 N. Martha St., Philadelphia, Pa.
Caldwell, Farley M., 6th & Harrison Sts., Fort Wayne, Ind.
Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calesco Corporation, 300 Broad St., Lynn, Mass.
California Cornice, Steel and Supply Corp., 1620 N. Spring St., Los Angeles, Cal.
California Wire Cloth Corp., 1001 22nd Ave., Oakland, Cal.
Calkins & Pearce, 203-205 E. Long St., Columbus, O.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
Caloroil Burner Corp., 1477 Park St., Hartford, Conn.
●Campbell, Andrew C., Division of American Chain & Cable Co., Inc., 929 Connecticut Ave., Bridgeport, Conn.
Campbell Heating Co., 31st and Dean, Des Moines, Ia.
Campbell Heating Co., E. K., 2445 Charlotte St., Kansas City, Mo.
Campbell Machine Co., 2845 Harriet Ave., Minneapolis.
Canatsey Electric Manufacturing Co., 620 Wyandotte, Kansas City, Mo.
Canton Steel Ceiling Mfg. Co., 2280 Winfield Way, S. E., Canton, O.
Canton Stoker Corp., 507 Andrews Pl., S. W., Canton, O.
Canvas Products Co., 1236 S. 7th St., St. Louis.
●Capital Furnace & Stove Repair, 523 E. Washington St., Indianapolis, Ind.
Capps, Joseph, Inc., 3200 Ardmore St., South Gate, Cal.
Carbo-Oxygen Co., 221-223 Fourth Ave., Pittsburgh, Pa.
Carey Co., Philip, Wayne Ave., Cincinnati, O.
●Carnegie-Illinois Steel Corp., Carnegie Bldg., Pittsburgh.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R. Lima, O.
Carpenter & Co., Geo. B., 440 N. Wells St., Chicago
Carrier Corp., 302 S. Geddes St., Syracuse, N. Y.
Carter Paint Co., 310 N. Main St., Liberty, Ind.
Cary Mfg. Co., Waupaca, Wis.
Cash Universal Register Co., Marshalltown, Iowa.
Celotex Corp., 919 N. Michigan Ave., Chicago, Ill.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago.
●Central Furnace & Stove Repair Co., 3937 Olive St., St. Louis, Mo.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
●Century Electric Co., 1806 Pine St., St. Louis, Mo.
●Century Engineering Corp., Cedar Rapids, Ia.
●Century Fan & Vent. Corp., 314 E. 39th St., New York City.
Certain-teed Products Corp., 100 E. 42nd St., New York City.
Certified Flexible Couplings, Inc., 122 E. 42nd St., New York City.
Chace, Co., W. M., 1606 Beard Ave., Detroit, Mich.
Chain Belt Co., 1644 W. Bruce St., Milwaukee.
Chain Products Co., 3910 Cooper Ave., Cleveland, O.
Chalmers Oil Burner Co., 1234 Central Ave., Minneapolis.
Chamberlin Metal Weather Strip Co., 1254 La Brosse, Detroit, Mich.
Champion Blower & Forge Co., Harrisburg Ave. & Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 918 S. Adams St., Peoria, Ill.
●Champion Tool Co., 376 W. 41st Place, Los Angeles, Cal.
●Chandler Co., 804 1st Ave., N. W., Cedar Rapids, Ia.
Chapman Clay Co., Zanesville, O.
Chapman Slate Co., 546 Main St., Bethlehem, Pa.
●Char-Gale Mfg. Co., 3127 Hiawatha Ave., Minneapolis, Minn.
Chase Brass & Copper Co., Inc., 236 Grand St., Waterbury, Conn.
Chelsea Fan & Blower Co., Inc., 370 W. 15th St., New York City.
Cheney Co., 1202 Architects Bldg., 17th & Sansom Sts., Philadelphia, Pa.
Chicago Air Filter Co., Joliet, Ill.
Chicago Automatic Stoker Co., Inc., 14 N. Clinton St., Chicago, Ill.
Chicago Belting Co., 113 N. Green St., Chicago.
Chicago Die Casting Co., 2520 W. Monroe St., Chicago.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago.
Chicago Metal Hose Corp., 1300 S. 3rd Ave., Maywood, Ill
Chicago Metal Mfg. Co., 3720 S. Rockwell St., Chicago, Ill.
Chicago Perforating Co., 2445 W. 24th Pl., Chicago, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Chicago Pump Co., 2336 Wolfram St., Chicago, Ill.
Chicago Rawhide Mfg. Co., 1312 Elston Ave., Chicago.
Chicago Rivet & Mach. Co., 1830 S. 54th Ave., Cicero, P. O., Chicago, Ill.
Chicago Steel & Wire Co., 103rd St. & Torrence Ave., Chicago, Ill.
Chicago Steel Furnace Co., 7934 S. Chicago Ave., Chicago.
Chinook, Inc., 111 Endicott-Arcade Bldg., St. Paul, Minn.
Cincinnati Electrical Tool Co., The, 2684 Madison Rd., Cincinati, O.
Cincinnati Mfg. Co., Gest & Evans Sts., Cncinnati, O.
●Cincinnati Shaper Co., Hopple, Garrard & Elam, Cincinnati, O.
●Cincinnati Sheet Metal & Roofing Co., 230 E. Front St., Cincinnati, O.
Cincinnati Stamping Co., 28-34 W. McMicken Ave., Cincinnati, O.
Circulators & Devices Mfg. Corp., 100 Prince St., New York City.
●Clarage Fan Co., North & Porter Sts., Kalamazoo, Mich.
Clark Bros. Bolt Co., Millidale, Conn.
Clark Controller Co., 1146 E. 152nd St., Cleveland, O.
Clark Dust Control Company, 210 N. Mozart St., Chicago.
Clark Jr., Electric Co., Jas., 600 Bergman St., Louisville, Ky.
Clark Stek-O Corp., 1631 Dewey Ave., Rochester, N. Y.
Clauss Shear Co., Fremont, O.
Clay Equipment Corp., Cedar Falls, Ia.
Clayton & Lambert Mfg. Co., 11111 French Rd., Detroit.
Cleveland Brush Factory, Inc., 7115 Dearborn Ave., S. W., Cleveland, O.
Cleveland Fire Brick Co., 1740 E. 12th St., Cleveland, O.
Cleveland Punch & Shear Works Co., E. 40th & St. Clair Ave., Cleveland, O.
●Cleveland Steel Products Corp., Toridheet Div., Madison at W. 74th St., Cleveland.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clough, A. W., 28 S. Broad St., Meriden, Conn.
Cocking, Geo. J., 1336 W. 5th St., Santa Ana, Cal.
Cole-Sullivan Engineering Company, 1316 Third St., North, Minneapolis, Minn.
Coleman Lamp & Stove Co., 2nd & St. Francis, Wichita, Kan.
Colonial Alloys Company, Sheet & Tube Div., 2154 E. Somerset St., Philadelphia.
Columbia Burner Co., 729 Ewing St., Toledo, O.
●Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco, Cal.
Columbian Enameling & Stamping Co., 1536 Beech St., Terre Haute, Ind.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus, O.
Columbus Metal Products, Inc., 767 N. 4th St., Columbus, O.
Comet Electric Company, 1237 St. Paul St., Indianapolis, Ind.
Comfort Products Corporation, 163 E. 154th St., Harvey, Ill.
Commonwealth Mfg. Corp., 4208 Davis Lane, Cincinnati, O.
Compton Shear Co., W. H., 314 Camden, Newark, N. J.
Conco Corporation, Mendota, Ill.
Condensation Engineering Corp., 2515 S. Archer Ave., Chicago, Ill.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago.
●Congress Tool & Die Co., 9034 Lumkin Ave., Detroit, Mich.
Connor Eng. Corp., W. B., 114 E. 32nd St., New York City.
Connors Paint Mfg. Co., Wm., 669-683 River St., Troy, N. Y.
Consolidated Metals Corp., 5531 Woodward Ave., Detroit.
Continental Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machine Specialties, Inc., 1301 Washington Ave., South, Minneapolis, Minn.
Continental Products Co., 1150 E. 222nd St., Euclid, O.
Continental Rubber Works, 1900 Liberty Parkway, Erie, Pa.
Continental Screw Co., Mt. Pleasant, New Bedford, Mass.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Continental Stove Corp., Front & Walnut, Ironton, O.
Cook, Inc., A. D., Lawrenceburg, Ind.
●Cook Electric Co., 2700 Southport Ave., Chicago, Ill.
Cooling Tower Co., Inc., The, Div. Fluor Corp., Ltd., 15 John St., New York City.
Coolmaster Corp., 530 S. Dearborn St., Chicago.
Cooper Co., Clark, 159 Jefferson St., Philadelphia.
Cooper & Cooper, Inc., 37 Fenn St., Pittsfield, Mass.
Cooper Oven Thermometer Co., Pequabuck, Conn.
Copeland Refrigeration Corp., Sidney, Ohio.
Copper Roofs Corp., 5060 Plankinton Bldg., Milwaukee.
Copperweld Steel Co., Glassport, Pa.
Coppus Engineering Corp., 344 Park Ave., Worcester, Mass.
Corbin Screw Corp., 300 High St., New Britain, Conn.
Corbman Bros., Inc., 1205 N. Fourth St., Philadelphia, Pa.
Cork Import Corp., 330 W. 42nd St., New York City.
Cork Insulation Co., Inc., 155 E. 44th St., New York City.
Cornell Iron Works, Inc., 36th Ave. & 13th St., Long Island City, N. Y.

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Cornell Manufacturing Co., 2571 Winthrop Ave., Indianapolis, Ind.
Cornell Wood Products Co., 230 N. Michigan Ave., Chicago.
Corozone Air Conditioning Corp., 1422 Euclid Ave., 1110 Hanna Bldg., Cleveland, O.
Cox Roofing Co., 1014 North-West Blvd., Winston-Salem, N. C.
Cramer Company, Inc., The R. W., Centerbrook, Conn.
Crane Co., 836 S. Michigan Ave., Chicago, Ill.
Crary Mfg. Co., 396 N. Second St., Middleport, O.
●Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crise Electric Mfg. Co., 316-320 S. Main St., Mt. Vernon, O.
Crocker-Wheeler Electric Mfg. Co., Ampere, N. J.
Cross Engineering Co., 160-178 Dundaff St., Carbondale, Pa.
Crouch Corporation, Birmingham, Mich.
Crowe Name Plate & Mfg. Co., 3710 Ravenswood Ave., Chicago.
Crown Cork & Seal Co., 4401 Eastern Ave., Baltimore.
Crown Fuel Saver Co., Richmond, Ind.
Crown Iron Works, 1229 N. E. Tyler, Minneapolis, Minn.
Crucible Steel Co. of America, 405 Lexington Ave., New York City.
Crystal Refrigerator Co., Fremont, Nebr.
Curtis Refrigerating Machine Co., 1946 Kienlen Ave., St. Louis, Mo.
Cutler-Hammer, Inc., N. 12th St. and W. St. Paul Ave., Milwaukee, Wis.

D

D. & M. Mfg. Co., 51 Lincoln Ave., Midland Park, N. J.
Dail Steel Products Co., 1050 Main St., Lansing, Mich.
Dallas Engineering Co., Inc., 1115 Hall, Dallas, Texas.
Dallman Supply Co., 6th & Q Sts., Sacramento, Cal.
Daniels Mfg. Co., Inc., Sam, Daniels Rd., Hardwick, Vt.
Danville Stove & Mfg. Co., Beaver St., Danville, Pa.
Davidson Hy Duty Roof Fan Co., Newton, Mass.
Davies Air Filter Corp., 390 4th Ave., New York City.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago.
Day Co., The, 2938 Pillsbury Ave., Minneapolis, Minn.
Day & Night Water Heater Co., Monrovia, Cal.
Dayton Greenhouse Mfg. Co., P. O. Box 801, Dayton, O.
Dayton Pump & Mfg. Co., 500 N. Webster St., Dayton, O.
Dayton Rogers Mfg. Co., 2830 13th Ave., So., Minneapolis.
Dayton Rubber Mfg. Co., 2345 W. Riverview Ave., Dayton, O.
Debevoise Co., 968 Grand St., Brooklyn, N. Y.
De Bothezat Ventilating Equipment Division, American Machine and Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Rd., Decatur, Ill.
Defender Automatic Regulator Co., 308 S. 8th St., St. Louis.
De Laval Steam Turbine Co., 300 Nottingham Way, Trenton, N. J.
D'Elia Oil Burner Co., Inc., 145 Stratford Ave., Bridgeport, Conn.
Delco Appliance Div., General Motors Sales Corp., 391 Lyell Ave., Rochester, N. Y.
Delco Products Division, General Motors Corp., 329 E. First St., Dayton, O.
Delta Stoker Co., Foot of Commonwealth, North Chicago, Ill.
Deming Co., 148 Aetna St., Salem, O.
Deniston Co., 4856 S. Western Ave., Chicago, Ill.
Densmore-Quinlan Co., 910 74th St., Kenosha, Wis.
Deshler Foundry & Machine Works, 140-142 S. East Ave., Deshler, O.
Des Moines Steel Furnace Co., 3713 Sixth Ave., Des Moines, Ia.
Des Moines Stove Repair Co., 107 S. W. Second St., Des Moines, Ia.
Detroit Air Meter Co., Box 1473, Detroit, Mich.
●Detroit Lubricator Co., 5900 Trumbull Ave., Detroit, Mich.
Detroit Michigan Stove Co., 6900 E. Jefferson Ave., Detroit.
Detroit Safety Furnace Pipe Co., 5960 Second Blvd., Detroit.
Detroit Stamping Co., 3457 W. Fort St., Detroit.
Detroit Steel Products Co., 2250 E. Grand Blvd., Detroit.
Detroit Stoker Co., General Motors Bldg., Detroit, Mich. (Sales & Engineering); Monroe, Mich. (Main Office & Works).
Detroit Surfacing Machine Co., 7433 W. Davison St., Detroit.
Detroit Torch & Mfg. Co., 12057 Cardoni Ave., Detroit.
De Vilbiss Co., 300 Phillips Ave., Toledo, O.
Devlin Mfg. Co., Thos., Burlington, N. J.
Diamond Castings Co., Terra Cotta Rd., Johnsonburg, Pa.
Diamond Chain & Mfg. Co., 400 Kentucky Ave., Indianapolis, Ind.
Diamond Mfg. Co., 243 W. 8th St., Wyoming, Pa.
Diamond Metal Weather Strip Co., 650 N. 4th St., Columbus, O.
Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.
Dickey-Grabler Co., 10298 Madison Ave., Cleveland.
Dickson & Eddy, 17 Battery Pl., New York City.
Dickson Weatherproof Nail Co., P. O. Box 466, Evanston, Ill.
Dieckmann Co., Ferdinand, 1182 Harrison St., Cincinnati, O.
Diehl Mfg. Co., Trumbull St., Elizabethport, N. J.
Diener Mfg. Co., Geo. W., 400 N. Monticello Ave., Chicago.
Disston & Sons, Inc., Henry, Unruh & Milner Sts., Tacony Sta., Philadelphia.
Dockson Co., C. H., 2847 Wabash Ave., Detroit.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
Doheny Co., John J., 326 Lake St., Belmont, Mass.
Dornback Furnace & Fdry. Co., 724 E. 103rd St., Cleveland.
Dowagiac Steel Furnace Co., Beeson St., Dowagiac, Mich.
Downs-Smith Brass & Copper Co., 304-320 E. 45th St., New York City.
●Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids, Mich.
Dracco Corp. 4057 E. 116th St., Cleveland, O.
Drayer & Hanson, Inc., 738 E. Pico Blvd., Los Angeles.
●Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago Ill.
Drouve Co. G., 2082 Kings Highway, Fairfield, Conn.
Dunham Co., C. A., 450 E. Ohio St., Chicago, Ill.
Dunn, Inc., Struthers, 1315 Cherry St., Philadelphia, Pa.
du Pont de Nemours & Co., E. I., Wilmington, Del.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dusing & Hunt, Inc., 1900 Elmwood Ave., Buffalo, N. Y.
Dwyer Mfg. Co., F. W., 565 W. Washington St., Chicago.
Dyer Welder & Engineering Co., 1401 Agnes Ave., Kansas City, Mo.

E

Eagle-Picher Lead Co., Temple Bar Bldg., Cincinnati, O.
East Anaheim Sheet Metal Works, 2299 E. Anaheim Blvd., Long Beach, Cal.
Easternoil, Inc., 133 Marginal Way, Portland, Me.
Eckenroth Register Co., 447 Sutter St. (Pac. G. & E. Bldg.), San Francisco, Cal.
Eclipse Aviation Div. Bendix Aviation Corp., Bendix, N. J.
Econocol Stoker Divison of Cotta Transmssion Corp., 2340 11th St., Rockford, Ill.
Economy Baler Co., 1020 N. Main St., Ann Arbor, Mich.
Economy Electric Manufacturing Co., 4634 W. 21st Pl., Cicero, Ill.
Economy Pumps, Inc., 2522 W. Congress St., Chicago.
Eddy Stoker Corp., 4717 W. North Avenue, Chicago.
Edison Electrical Controls Division, Thos. A. Edison, Inc., Lakeside Ave., West Orange, N. J.
Edwards Furnace Co., 25 East Ave., Wellsboro, Pa.
Edwards Mfg. Co., Inc., 337 Eggleston Ave., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eiermann Floor Scraper Co., 1971 Fulton St., Brooklyn, N. Y.
Eiker Mfg. Company, Ogallala, Nebr.
●Eisler Engineering Co., 760 S. 13th St., Newark, N. J.
Electric Arc Cutting & Welding Co., 152 Jelliff Ave., Newark, N. J.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, O.
Electric Furnace-Man, Inc., 101 Park Ave., New York City.
Electric Machinery Mfg. Co., 1331 Tyler St., N. E., Minneapolis.
Electric Materials Co., Clay & Washington Sts., North East, Pa.
Electric Soldering Iron Co., Inc., Deep River, Conn.
Electric Sprayit Co., 224 N. Broadway, Milwaukee, Wis.
●Electric Vacuum Cleaner Co., Inc., 1734 Ivanhoe Rd., Cleveland, O.
Electric Valve Mfg. Co., Inc., 68 Murray St., New York City.
Electrimatic Corp., 2100 S. Indiana, Chicago, Ill.
Electroaire Corp., 1455 W. Congress St., Chicago, Ill.
Electrogas Furnace Co., 2575 Bayshore Blvd., San Francisco.
Electrol, Inc., 934 Main Ave., Clifton, N. J.
Electrovent Corp., 5245 Western Ave., Detroit, Mich.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago, Ill.
●Elgo Shutter & Mfg. Co., 634 W. Warren Ave., Detroit.
Ellison Draft Gage Co., 214 W. Kinzie St., Chicago, Ill.
Elsey Metal Specialties Co., 1535 Spruce St., Detroit, Mich.
Emerson Electric Mfg. Co., 1843 Washington Ave., St. Louis.
Empire Door Co., Inc., 226 E. 144th St., New York City.
Empire Metal Co., 820 E. Water St., Syracuse, N. Y.
Empire Sheet & Tin Plate Co., N. Bowman St., Mansfield, O.
Emrich Co., Inc., 312 Broad St., Columbus, O.
Engelhard, Inc., Chas., Newark, N. J.
Engineering and Research Corporation, Riverdale, Md.
Enterprise Foundry Co., 1123 E. "B" St., Belleville, Ill.
Erdle Perforating Co., 171 York St., Rochester, N. Y.
Eselgroth & Co., 22 Edison Place, Newark, N. J.
Estate Stove Co., Hamilton, O.
Etched Products Co., 3901 Queens Blvd., Long Island City.
Evans Corp., George, 121 37th St., Moline, Ill.
Evans Products Co., Evanoil Heater Div., Detroit.
Everhot Mfg. Co., 57 S. 19th Ave., Maywood, Ill.
Excello Oil Heating Corp., 111½ S. 24th St., Omaha, Nebr.
●Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago.
Excelsior Stove & Mfg. Co., 504-630 S. Front St., Quincy, Ill.
Excelsior Tool and Machine Co., 31st & Ridge Ave., East St. Louis, Ill.

F

Fabling Co., W. D., 722 N. Broadway, Los Angeles, Cal.
Fafnir Bearing Co., 37 Booth St., New Britain, Conn.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago, Ill.
Fairfield Oil Heating Co., Inc., Mason St., Greenwich, Conn.
Fairmont Aluminum Co., Fairmont, W. Va.
Falstrom Co., Main Ave. & D. L. & W. R. R., Passaic, N. J.
Familian Pipe & Supply Co., 1101 Mateo St., Los Angeles.
Fargo Foundry Co., 92 N. P. Ave., Fargo, N. D.

● Advertisement in this issue. See Index to Advertisers, page 206

●Farquhar Furnace Co., 150 Owens Ave., Wilmington, O.
●Farrell-Cheek Steel Company, First & Lane Sts., Sandusky, Ohio.
Farris Furnace Co., 920-930 Enos Ave., Springfield, Ill.
●Faultless Heater Corp., 10402 St. Clair Ave., Cleveland, O.
Favorite Stove Co., Young & Weber Sts., Piqua, O.
Fedders Mfg. Co., 57 Tonawanda St., Buffalo, N. Y.
Federal Machine & Welder Co., 212 Dana St., Warren, O.
Federal Mogul Corp., 11031 Shoemaker St., Detroit.
Fee and Stemwedel, Inc., 4949 N. Pulaski Rd., Chicago, Ill.
Felters Co., Inc., 210 South St., Boston, Mass.
Field Mfg. Co., 2328 Nelson St., Chicago, Ill.
Figge Mfg. Co., 189 W. Madison St., Chicago, Ill.
Fingles, Inc., W. A. Reisertown Road at Elgin Ave., Baltimore, Md.
Finnell Rotary Stokers, Inc., 502 East St., Elkhart, Ind.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago, Ill.
Firemood Machine Wks., Converse, Ind.
Firestone Tire & Rubber Co., 1400 S. Main St., Akron, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fisher Governor Co., 203 S. First Ave., Marshalltown, Ia.
●Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York City.
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City, N. Y.
Flexo Supply Co., Inc., 4221 Olive St., St. Louis.
Flintkote Co., 50 W. 50th St., New York City.
Floral City Co., 402 S. Monroe St., Monroe, Mich.
Florence Stove Co., 205 School St., Gardner, Mass.
Floyd-Wells Co., Royersford, Pa.
Fluid Heat Division Anchor Post Fence Co., Eastern Ave. & Kane St., Baltimore.
Flynn & Emrich Co., 301 Holliday St., Baltimore, Md.
Follansbee Brothers Co., 3rd & Liberty Aves., Pittsburgh.
Folsom Snow Guard Co., 80 Boylston St., Boston, Mass.
Foote Foundry Co., J. B., N. Main St., Fredericktown, O.
Forct-Air Co., 840 Cedar St., Rockford, Ill.
Ford Roofing Products Company, 111 W. Washington St., Chicago.
●Forest City Foundries Co., 2500 W. 27th St., Cleveland, O.
Forker Corporation, 4614 Prospect Ave., Cleveland.
Fowler-Pem Co., 5317 Horton St., Emeryville, Cal.
Foxboro Co., Neponset Ave., Foxboro, Mass.
Franklin Gas Heating Co., 1232 Vine St., Cincinnati, O.
●Frederick Iron & Steel Co., E. 7th & East Sts., Frederick, Md.
Fresh'nd-Aire Co., 2626 Washington Blvd.., Chicago.
Frick Co., Waynesboro, Pa.
Friedley-Voshart Co., 763 W. Lexington St., Chicago.
Friez & Sons, Julien P., 4 N. Central Ave., Baltimore.
Frigidaire Commercial & Air Conditioning Division, General Motors Sales Corporation, Dayton, O.
Fuel Savers Inc., 15th & Herr Sts., Harrisburg, Pa.
Fuller-Warren Co., 2506 N. 32nd St., Milwaukee, Wis.
Fulton Sylphon Co., Knoxville, Tenn.
●Furblo Co., Hermansville, Mich.
Furnaceslave, Inc., 1080 E. 52nd St., Indianapolis, Ind.

G

●G. & O. Mfg. Co., 138 Winchester Ave., New Haven, Conn.
G. & S. Tool Co., 8790 Grinnell, Detroit, Mich.
G. D. S. Machinery & Supply Co., 101 Walker St., New York City.
Gale Products, Galesburg, Ill.
Galva Heater Co., Galva, Ill.
Gammeter Co., W. F., Lincoln Ave. Extension, Cadiz, O.
Garber Lumber & Construction Co., Strasburg, O.
Garden City Fan Co., 332 S. Michigan Blvd., Chicago, Ill.
Gardiner Metal Co., 2501 W. 48th Pl., Chicago, Ill.
Gardner Manufacturing Co., Horicon, Wis.
Gas City Glass Co., Gas City, Ind.
Gascol Furnace Co., The, 3126 Preble Ave., Pittsburgh.
Gasconaire, Inc., 3255 Goldner Ave., Detroit.
Gasweld Equipment Co., 625 W. Jackson Blvd., Chicago, Ill.
Gates Rubber Co., 999 S. Broadway, Denver, Colo.
Gehl Bros. Mfg. Co., West Bend, Wis.
Gehri Co., 1117 Tacoma Ave., Tacoma, Wash.
General Blower Co., 2402 Market St., Philadelphia, Pa.
General Blower Corp., 1450 Army St., San Francisco.
●General Controls Co., 700 W. Ivy St., Glendale, Cal.
●General Electric Co., Air Cond. Div., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., 1 River Rd., Schenectady, N. Y.
General Equipment Co., 311-15-19 S. Wichita St., Wichita, Kan.
General Etching & Mfg. Co., 3076 W. Grand Ave., Chicago.
General Gas Light Co., Kalamazoo, Mich.
General Insulating & Mfg. Co., 705 Olive St., St. Louis.
General Insulating Products Co., 3821 15th Ave., Brooklyn.
General Metal Products Co., 3883 Delor St., St. Louis, Mo.
General Machine Co., Inc., 816-826 E. 140th St., New York City.
General Machinery Co., 3500 Riverside Ave., Spokane, Wash.
General Oil Heating Corp., 528 Jefferson St., West New York, N. J.
General Plate Co., Attleboro, Mass.
General Refrigeration Corporation, Shirland Ave., Beloit, Wis.
General Regulator Corp., 2608 Arthington St., Chicago, Ill.
General Stokers, Inc., 2925 N. Broad St., Philadelphia.
Gerard Chemical Co., 87 Front St., Elizabeth, N. J.
●Gerett Corp., M. A., 2947 N. 30th St., Milwaukee.
Gerhardt, W. F., 2007 W. Broad St., Richmond, Va.
Germer Stove Co., Erie, Pa.
Geuder, Paeschke & Frey Co., W. St. Paul Ave. and N. 15th St., Milwaukee, Wis.
Giant Grip Mfg. Co., 31 Osceola St., Oshkosh, Wis.
Giant Mfg. Company, South Ave., Council Bluffs, Ia.
Gilbert & Barker Mfg. Co., Springfield, Mass.
Gilbert & Son, Harry E., 11 Brooklawn Terrace, Bridgeport, Conn.
Gillian Mfg. Co., 7752 Dubois St., Detroit.
Gilmer Co., L. H., Cottman & Keystone Sts., Tacony, Philadelphia, Pa.
Glasby Manufacturing Co., Inc., J. P., Locust Ave. & Nelson St., Bloomfield, N. J.
●Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glidden Co., 11001 Madison Ave., Cleveland, O.
Globe Iron Roofing & Corrugating Co., P. O. Box 734, Cincinnati, O.
Globe Machine & Stamping Co., 1250 W. 76th St., Cleveland, O.
Globe Machinery & Supply Co., 205-211 W. Court Ave., Des Moines, Ia.
G. M. Mfg. Co., Box 151 Madison Square Station, New York City.
●Goese Mfg. Co., 2548 N. 18th St., Milwaukee, Wis.
Goethel Co., Alfred C., 2337 N. 31st St., Milwaukee, Wis.
Goethel Sheet Metal Works, Alfred, 1912 N. Killian Pl., Milwaukee, Wis.
Golden-Anderson Valve Specialty Co., Fulton Bldg., Pittsburgh, Pa.
Goldens' Foundry & Machine Co., Columbus, Ga.
Gold Seal Furnace Co., 234 S. Fourth St., Minneapolis, Minn.
Gold Star Oil Burner Mfg. Co., Inc., 146 Warburton Ave., Yonkers, N. Y.
Goodrich Co., B. F., 500 S. Main St., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 605 W. Main St., Oklahoma City, Okla.
Grammes & Sons, Inc., 388 Union St., Allentown, Pa.
Grand Rapids Blow Pipe and Dust Arrester Co., 525 Monroe Ave., Grand Rapids, Mich.
Grand Rapids Die & Tool Co., 113-117 Michigan St., Grand Rapids, Mich.
Grand Rapids Wire Products Co., 503 Front Ave., N. W., Grand Rapids, Mich.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Gray, G. L., New Haven, Conn.
Gray Metal Products, Inc., 30 Carlton St., Rochester, N. Y.
Green Foundry & Furnace Works, 322 S. W. Third St., Des Moines, Ia.
Greene, Tweed & Co., 109 Duane St., New York City.
Grinnell Co., Inc., 260 W. Exchange St., Providence, R. I.
Griscom-Russell Co., The, 285 Madison Ave., New York City.
Griswold Mfg. Co., 1001-1065 W. 12th St., Erie, Pa.
Grob Brothers, Grafton, Wis.
Grobet File Corp. of America, 3 Park Place, New York City.
Grossenbacher Steel Furnace & Mfg. Co., 2626 Woodson Rd., St. Louis.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago.
Guardian Utilities Co., 215 E. Michigan St., Michigan City, Ind.
Gulf States Steel Co., Brown-Marx Bldg., Birmingham, Ala.

H

Hague & Co., Inc., Alfred, 227 34th St., Brooklyn, N. Y.
Halectric Laboratories, 1793 Lakeview Rd., Cleveland, O.
Hall Mfg. Co., Cedar Rapids, Ia.
Hall Metal Products Co., 1285 Wilmington Blvd., Long Beach, Cal.
Hall-Neal Furnace Co., 1324 N. Capitol Ave., Indianapolis, Ind.
Hallstead Iron Foundry, Hallstead, Pa.
Hamilton Automatic Stoker Corp., 1637 Dixie Highway, Hamilton, O.
Hammett Mfg. Co., 209 W. 19th Ter., Kansas City, Mo.
Hammond Machinery Builders, 1626 Douglas Ave., Kalamazoo, Mich.
Hampton Elec. Tool Co., 700 Walnut St., Edgewood, Pittsburgh, Pa.
Handelan Washed Air Co., 305 Fifth St., S., Minneapolis.
Handley Brown Heater Co., Jackson, Mich.
Handy & Harmon, 82 Fulton St., New York City.
Hardinge Oil Burner Co., 1770 Berteau St. at Ravenswood, Chicago, Ill.
Hardy Mfg. Co., 126 Davis Ave., Dayton, O.
Hare Stoker Corp., 4853 Rivard St., Detroit, Mich.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee.
Harold Furnace Mfg. Co., 3310 Sprague Ave., Spokane, Wash.
●Harrington & King Perforating Co., 5649 Fillmore St., Chicago, Ill.
Harris, A. R., 4548 Hohman Ave., Hammond, Ind.
Harris Calorific Co., 5501 Cass Ave., N. W., Cleveland, O.
●Hart & Cooley Mfg. Co., 61 W. Kinzie St., Chicago, Ill., and Holland, Mich.
Hart & Crouse Corporation, 301 Turner St., Utica, N. Y.
Hart Mfg. Co., Bartholomew & Hamilton Sts., Hartford, Conn.
Hart Mfg. Co., 2006 N. Western Parkway, Louisville, Ky.
Hart Oil Burner Corp., 2200 N. Adams St., Peoria, Ill.
Hartzell Propeller Fan Co., 1025 Roosevelt Ave., Piqua, O.

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Harvey-Whipple, Inc., 55 Emery St., Springfield, Mass.
Haskins Co., R. G., 615 S. California Ave., Chicago.
Hassall, Inc., John, Clay & Oakland Sts., Brooklyn, N. Y.
Hastings Air Conditioning Company, Inc., Box 481, 108 S. Colorado Ave., Hastings, Nebr.
Hauck Mfg. Co., 124-136 Tenth St., Brooklyn, N. Y.
Hauserman Co., E. F., 6800 Grant Ave., Cleveland.
Haynes Furnace Fan Co., 614 Prospect St., Kansas City, Mo.
Hays Corp., E. Eighth St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
H-B Instrument Co., Inc., 2518 N. Broad St., Philadelphia.
Health-O-Mist Humidifier Mfg. Co., James St., Columbus, Wis.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heath & Milligan Mfg. Co., Div. of The Glidden Co., 1833 S. Normal Ave., Chicago, Ill.
Heating Assurance, Inc., 124 E. Augusta, Spokane, Wash.
Heatseal Burner Co., 2501 Leavenworth St., Omaha, Nebr.
Heckler Bros., 965 Liberty Ave., Pittsburgh, Pa.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
●Heil Co., 3000 W. Montana St., Milwaukee, Wis.
Hemp Engineering & Stoker Corp., Macomb, Ill.
Hendley & Whittemore Co., 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henry & Wright Mfg. Co., 760 Windsor St., Hartford, Conn.
●Henry Furnace & Foundry Co., 3473 E. 49th St., Cleveland, O.
Herbert & Sons, T. L., Nashville, Tenn.
Her-Born Eng. & Mfg. Co., Box 666, Sandusky, O.
Herbusch Corporation, The, Simplex Control Div., 706 Chestnut St., St. Louis.
●Herco Oil Burner Corp., 109 Chestnut St., Lancaster, Pa.
Hercules Chemical Co., Inc., 332 Canal St., New York City.
Heritage Stoker Sales, Inc., 105 E. 63rd St., Chicago, Ill.
Herrmann & Grace Co., 671 Bergen St., Brooklyn, N. Y.
Herron-Zimmers Moulding Co., 3654 Beaufait, Detroit, Mich.
Hess-Snyder Co., Massillon, O.
●Hess Warming & Ventilating Co., 1221-1227 S. Western Ave., Chicago, Ill.
Hetzel Roofing Products Co., 67 Main St., Newark, N. J.
Hill Co., E. Vernon, 6628 W. Highland Ave., Chicago, Ill.
Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y.
Hinde & Dausch Paper Co., Sandusky, O.
Hipoint Corp., Water, Elm & Arnold Sts., Bellefontaine, O.
Hirschman Co., Inc., W. F., 220 Delaware Ave., Buffalo, N. Y.
Hobart Brothers Co., Canal Lock Square, Troy, O.
Hoffman Combustion Eng., Co., 710 Marquette Bldg., Detroit.
Hoffman Specialty Co., Inc., Waterbury Natl. Bank Bldg., Waterbury, Conn.
Hoffman Thermal Sales Co., 103 E. Liberty St., Ann Arbor, Mich.
Holcomb & Hoke Mfg. Co., 1545 Van Buren St., Indianapolis, Ind.
Holley Heating & Mfg. Co., 21 S. Chester St., Pasadena, Cal.
Hollup Corp., 3357 W. 47th Pl., Chicago, Ill.
Holtum Mfg. Co., Freeport, Ill.
Holtzer-Cabot Electric Co., 125 Amory St., Boston, Mass.
Home Furnace Co., 6th St. & P. M. R. R., Holland, Mich.
Home Stove Co., 501 Kentucky Ave., Indianapolis, Ind.
Hones, Inc., Charles A., 122 S. Grand Ave., Baldwin, N. Y.
Hood Co., B. Mifflin, Daisy, Tenn.
Horn Co., A. C., 43-36 Tenth St., Long Island City, N. Y.
Horton Mfg. Co., 3008 University Ave., S. E., Minneapolis.
Hotentot Co., Inc., 1708 Howard St., Omaha, Nebr.
Hotstream Heater Co., 8007 Grand Ave., Cleveland, O.
Howe & Bassett Co., Inc., 840 University Ave., Rochester, N. Y.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago.
Howell Electric Motors Co., Howell, Mich.
Howell Mfg. Co., 1625 Cleveland Ave., Kansas City, Mo.
Howes Co., S. M., 511 Medford St., Charlestown District, Boston, Mass.
Hubbard Co., 1014 Marquette Ave., Minneapolis, Minn.
Hubbell Corp., 1315 W. Carroll Ave., Chicago.
Hub Specialty Co., 84 Governor Winthrop Rd., Somerville, Mass.
Hudson Equipment Corp., 324 Third Ave., N., Minneapolis.
Hudson-Root Company, P. O. Box 124, Brocton, N. Y.
Hugo Mfg. Co., 49th Ave., W. & Superior St., Duluth, Minn.
Hunt & Son, C. B., Box 300, Salem, Ohio.
●Hussey & Co., C. G., 2850 Second Ave., Pittsburgh, Pa.
Huwer Heating Corp., 2375 West Fort St., Detroit.
Huyette Co., Inc., Paul B., Philadelphia.
Hyatt Roller Bearing Co., Harrison, N. J.

I

Ice Cooling Appliance Corp., Morrison, Ill.
Ideal Commutator Dresser Co., 1084 Park Ave., Sycamore, Ill.
Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Furnace Co., 2995 E. Grand Blvd., Detroit, Mich.
Ideal Heating Corp., 2224 Oak St., Santa Monica, Cal.
Ilg Electric Ventilating Co., 2850 N. Crawford Ave., Chicago, Ill.
Illinois Iron & Bolt Co., 918 S. Michigan Ave., Chicago, Ill.
●Illinois Testing Laboratories, Inc., 412 N. LaSalle St., Chicago, Ill.
Illinois Zinc Co., Peru, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill.
Imperial Electric Co., Ira Ave., Akron, O.
Imperial Molded Products Corp., 2925 W. Harrison St., Chicago.
Independence Stove & Furnace Co., Cor. Hayward & Cottage, Independence, Mo.
Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill.
●Independent Register Co., 3747 E. 93rd St., Cleveland, O.
Indian Trailer Corporation, Koolroom Div., 2338 Indiana Ave., Chicago, Ill.
Industrial Apparatus Co., 720 N. Wabash Ave., Chicago.
Industrial Engineering Co., Evansville, Ind.
Industrial Research, Lansdowne, Pa.
Industrial Sheet Metal Works, Inc., 628 E. Forest Ave., Detroit.
Ingles Elbow Machine Corp., 2634 Fullerton Ave., Chicago.
Ingersoll-Rand Co., 11 Broadway, New York City.
Ingersoll Steel & Disc. Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago, Ill.
Inter-Coastal Paint Co., 15th & Southern R. R., East St. Louis, Ill.
Insto-Gas Corporation, 1900 E. Jefferson, Detroit.
Insul-Wool Insulation Corp., Wichita, Kansas.
Insulite Co., 1100 Builders Exchange Building, Minneapolis.
International Engineering, Inc., 1145 Bolander, Dayton, O.
International Engineering Wks., Inc., Framingham, Mass.
International Heater Co., 101 Park Ave., Utica, N. Y.
●International Nickel Co., Inc., 67 Wall St., New York City.
International Steel Co., 1556 Edgar St., Evansville, Ind.
International Vermuculite Co., 11th & Stanford Ave., Springfield, Ill.
●Interstate Machinery Co., Inc., 130 S. Clinton St., Chicago.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia, Pa.
Iowa Foundry Co., W. 2nd & Cook, Sioux City, Ia.
Iowa Paint Mfg. Co., 118-20 Eighth St., Des Moines, Ia.
Iron Fireman Mfg. Co., 3170 W. 106th St., Cleveland, O.
Iwan Brothers, 1503 Prairie Ave., South Bend, Ind.

J

Jackson-Bangor Slate Co., Pen Argyl, Pa.
Jackson Sheet Metal Works, 3012 Washington Ave., Ogden, Utah.
Jackson & Church Co., 321 N. Hamilton Ave., Saginaw, Mich.
Jacobs Co., B. & J., 1725 Johns St., Cincinnati, O.
Jacobsen Mfg. Co., Washington at 8th, Racine, Wis.
Jacobson Machine Works, Inc., A. E., 1090 Tenth Ave., S. E., Minneapolis, Minn.
Jaden Mfg. Co., Inc., F., 1601 2nd St., Hastings, Nebr.
Jamar Co., Walker, 367 S. First Ave., E., Duluth, Minn.
James Regulator Co., Inc., Peacock St., Pottsville, Pa.
●Janette Mfg. Co., 556 W. Monroe St., Chicago, Ill.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
Jeffrey Mfg. Co., The, 862 N. 4th St., Columbus, Ohio.
Jelliff Mfg. Corp., C. O., Southport, Conn.
Jessop Steel Co., Washington, Pa.
Jewel Mfg. Co., 1874 Highland Parkway, St. Paul.
Jewett Stove & Foundry Corp., Military Rd., Buffalo, N. Y.
●Joal Mfg. Corp., 2058 Canton St., Toledo.
Johns-Manville, 22 E. 40th St., New York City.
Johnson Bronze Co., S. Mill St., New Castle, Pa.
●Johnson Co., S. T., 940 Arlington Ave., Oakland, Cal., and 401 N. Broad St., Philadelphia, Pa.
Johnson Fan & Blower Corp., 1319 W. Lake St., Chicago, Ill.
●Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Co., Lloyd S., 2241 Indiana Ave., Chicago.
Johnson, Inc., William, Brenner & Kent Sts., Newark, N. J.
Johnson Mfg. Co. Tenth & Sycamore, Waterloo, Ia.
Johnson Service Co., 507 E. Michigan St., Milwaukee, Wis.
Johnson Tool Co., Inc., 65 Massasoit Ave., East Providence, R. I.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago, Ill.
Johnson & Jennings Co., 877 Addison Rd., Cleveland, O.
Johnston Co., Wm. W., 115 Bayard St., Dayton, O.
Johnston Gas Furnace Corp., 11847 Vose St., North Hollywood, Cal.
Johnston Mfg. Co., 2825 E. Hennepin Ave., Minneapolis.
Johnston Tin Foil & Metal Co., 6100 S. Broadway, St. Louis.
Joliet Heating Corp., 1403 Herkimer St., Joliet, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh, Pa.
Jones Foundry & Machine Co., W. A., 4401 W. Roosevelt Rd., Chicago, Ill.
Jones Products Corporation, Ferndale, Mich.
Jordan & Co., Paul R., 630 S. Delaware St., Indianapolis, Ind.

K

Kais Sunrise Works, 5659 Linwood Ave., Detroit, Mich.
Kaiser Co., H. S., 3336 Franklin Blvd., Chicago.
Kalamazoo Stove and Furnace Co., Kalamazoo, Mich.
Kansas City Furnace Co., 624 Prospect, Kansas City, Mo.
Kauffman Air Conditioning Corp., 4336 W. Pine St., St. Louis, Mo.
Kaustine Co., Inc., Perry, N. Y.
Kaybar Burner Corp., 4545 Cottage Grove Ave., Chicago, Ill.

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Keasbey Co., Robert A., 139 W. 19th St., New York City.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keith Furnace Co., Dean Ave. at E. 26th, Des Moines, Ia.
Keldur Corp., 420 Lexington Ave., New York City.
Keller, Inc., Wm. H., Grand Haven, Mich.
Kelsey Heating Co., Inc., 277 James St., Syracuse, N. Y.
Kelvinator Division, Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit.
Kelvin-White Co., 90 State St., Boston.
Kennard, Inc., Sam, 3333-35 Market St., St. Louis.
Kent Co., Inc., 103 Canal St., Rome N. Y.
Kent Co. Inc., J. King, 6477 Manchester Ave., St. Louis.
Kerentoff, G. L., 2803 Jefferson Ave., Cincinnati.
Kernchen Co., 103 E. Wacker Dr., Chicago, Ill.
Kester Solder Co., 4201 Wrightwood Ave., Chicago, Ill.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
Kimberly-Clark Corp., 8 S. Michigan Ave., Chicago.
King Metal Co., 601 North Indiana, Oklahoma City, Okla.
King Ventilating Co., Box 178, Owatonna, Minn.
Kinnear Mfg. Co., P. O. Box 598, Columbus, O.
Kirk & Blum Mfg. Co., 2850 Spring Grove Ave., Cincinnati, O.
Kisco Co., Inc., 39th & Chouteau Ave., St. Louis.
Kitson Co., Westmoreland & Stokley Sts., Philadelphia, Pa.
Klauer Mfg. Co., 9th & Washington Sts., Dubuque, Ia.
Klee Co., Geo. B., 1056-58 Hulbert Ave., Cincinnati, O.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago, Ill.
Klein Stove Co., Trenton Ave. & Tioga St., Philadelphia, Pa.
●Klenk's Aviation Snips, 107 E 5th St., Wilmington, Del.
Knickerbocker Co., Jackson, Mich.
Knowles Mushroom Ventilator Co., 11 Label St., Montclair, N. J.
Knowles Air Conditioning, 1324 Marshall St., N. E., Minneapolis.
Kol-Master Corp., Oregon, Ill.
Koons Furnace Co., 219 W. Van Buren, Danville, Ill.
Koppers Co., Koppers Bldg., Pittsburgh, Pa.
Korfund Co., Inc., 48-15 32nd Pl., Long Island City, N. Y.
Korth Oil Burner Corp., 123 Hawthorne St., Roselle Park, N. J.
Kraissl Co., Inc., 620 Main St., Hackensack, N. J.
Kraker, Henry, 54 W. 14th St., Holland, Mich.
Kramer Trenton Co., 626 Brunswick Ave., Trenton, N. J.
Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.
Kruse & Dewenter Co., 427-429 E. Washington St., Indianapolis, Ind.

L

Laclede-Christy Clay Products Co., 411 N. Seventh St., St. Louis, Mo.
Laclede Steel Co., Arcade Bldg., St. Louis, Mo.
Laco Oil Burner Co., 238 Union St., Griswold, Ia.
La Crosse Steel Roofing & Corrugating Co., 300 S. Third St., La Crosse, Wis.
Lamb & Ritchie Co., 250 Albany St., Cambridge, Mass.
●Lamneck Products, Inc., 414 Dublin Ave., Columbus, O.
Landwehr Heating Corp., 6th & Cayuga Sts., Philadelphia.
Langsenkamp Co., F. H., 229 E. South St., Indianapolis, Ind.
Larkin Coils, Inc., 519 Fair St., S. E., Atlanta, Ga.
Lastik Products Co., Inc., 603 American Bank Bldg., Pittsburgh, Pa.,
●Lau Blower Co., Home & Orchard Ave., Dayton, O.
Layne & Bowler, Inc., Memphis, Tenn.
Leach Co., 412 S. Main St., Oshkosh, Wis.
Leahy Mfg. Co., 1804 E. 8th St., Los Angeles, Cal.
Lecourtenay Co. 5 Main St., Newark, N. J.
Ledkote Products Co., 35-01 Vernon Blvd., Long Island City, N. Y.
Lee & Son Co., K. O., Aberdeen, S. D.
Lee & Son, Thomas, 128-132 W. Second St., Cincinnati, O.
Leeds & Northrup Co., 4953 Stenton Ave., Philadelphia, Pa.
Leeson Co., T. F., 14631 Meyers Rd., Detroit, Mich.
Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., Front & Linden Sts., Allentown, Pa.
Leland Electric Co., 1501 Webster St., Dayton, O.
Lennox Furnace Co., 200 Lincoln Highway, Marshalltown, Ia., and Syracuse, N. Y.
●Levow, David, 308 W. 20th St., New York City.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis, Mo.
Libbey-Owens-Ford Glass Co., Box 919, Toledo, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Liberty Coal Burner Co., 4363 Duncan St., St. Louis, Mo.
Liberty Foundry Co., Sidney & Ohio Sts., St. Louis, Mo.
Lincoln Electric Co., 12818 Coit Rd., Cleveland, O.
Linde Air Products Co., The, 30 E. 42nd St., New York City.
Linderme Machine & Tool Co., Inc., 12233 Coyle Ave., Detroit.
Link-Belt Co., Stoker Div., 2410 W. 18th St., Chicago, Ill.
Liquefied Gas Appliance Co., Mars, Pa.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Little Burner Co., Inc., H. C., 2nd & Lincoln, San Rafael, Cal.
Little Janitor Furnace Clock Co., 621 Broadway, New York City.
Littleford Bros., 457 E. Pearl St., Cincinnati, O.
●Lochinvar Corp., 14247 Tireman Ave., Dearborn, Mich.
●Lockformer Co., 4630 W. Flournoy St., Chicago, Ill.
Logan-Long Co., 37 W. Van Buren St., Chicago, Ill.
Lohman, Inc., William J., 62 Ninth Ave., New York City.
Lookout Furnace Co. Manufacturer's Rd., & Compress St., Chattanooga, Tenn.
Lord Mfg. Co., 1641 W. 12th St., Erie, Pa.
Lovejoy Flexible Coupling Co., 5001 W. Lake St., Chicago.
Ludlow-Saylor Wire Co., Newstead Ave. & Wabash R. R., St. Louis, Mo.
Ludowici-Celadon Co., 104 S. Michigan Ave., Chicago.
Lukens Metal Co., Thos. F., Hedley & Bath Sts., Philadelphia.
Lukens Steel Co., 308 S. First Ave., Coatesville, Pa.
Lustro Coated Sheets Co., 1220 Ridge Ave., Pittsburgh, Pa.
Lyman Co., H. B., Southampton, Mass.
Lyon Conklin & Co., Inc., Race & McComas St., Baltimore.

M

Maas & Waldstein Co., 438 Riverside Ave., Newark, N. J.
McClave-Brooks Co., W. Poplar St., Scranton, Pa.
McClure Builders' Supply Co., 68 E. Clark St., East Palestine, O.
McCord Radiator & Mfg. Co., 2587 E. Grand Blvd., Detroit.
McCorkle Co., D. H., Sixth & Bancroft Way, Berkeley, Cal.
Macrae, Inc., 554 Vanderbilt Ave., Brooklyn.
McDonnell & Miller, 400 N. Michigan Ave., Chicago, Ill.
McKay Co., 1005 Liberty Ave., Pittsburgh, Pa.
●McLeod & Henry Co., Inc., 357 First St., Troy, N. Y.
McNamee Products, 370 Hazel Ave., Glencoe, Ill.
McPherson Furnace & Supply Co., 1805 N. E. 2nd Ave., Portland, Ore.
McQuay, Inc., 1600 Broadway, N. E., Minneapolis, Minn.
MaGirl Foundry & Furnace Works, P. H., 401-413 E. Oakland Ave., Bloomington, Ill.
●Magnet Switch Co., 356 W. Huron St., Chicago.
Mahan Oil Burner & Furnace Co., Lake & Church, Elmhurst, Ill.
Mahon Co., R. C., 8650 Mt. Elliott Ave., Detroit, Mich.
●Maid-O'-Mist, Inc., 180 N. Wacker Dr., Chicago, Ill.
●Majestic Co., 733 Erie St., Huntington, Ind.
Majestic Furnace Co., 1723 Westlake Ave. N., Seattle, Wash.
Mall Tool Company, 7740 South Chicago Ave., Chicago, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City, N. Y.
Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Manley Products Corp., State & Hay Sts., York, Pa.
Manning, Maxwell & Moore, Inc., 11 Elias St., Bridgeport Conn.
Manufacturers Fin Coil Co., 2505 S. Pulaski Rd., Chicago.
Maple City Furnace Co., 605 S. Main St., Monmouth, Ill.
Maple Valley Mfg. Co., First St., Mapleton, Ia.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago.
Marathon Electric Mfg. Corp., 131 W. Washington St., Wausau, Wis.
Marblehead Lime Co., 160 N. LaSalle St., Chicago.
Marble-Card Electric Co., Gladstone, Mich.
Marion Furnace Co., 12853 Hamilton Ave., Detroit.
Marion Machine, Foundry & Supply Co., P. O. Box 685 Marion, Ind.
Marley Co., 3001 Fairfax Rd., Kansas City, Kan.
Marlin-Rockwell, Jamestown, N. Y.
Marlo Coil Co., 6135 Manchester Ave., St. Louis, Mo.
Marquette Mfg. Co., Inc., 401-409 Johnson St., N. E., Minneapolis, Minn.
Marsh Corporation, Jas. P., 2073 Southport Ave., Chicago.
Marsh Lumber Co., Inc., 535-611 Tuscarawas Ave., N. W., Dover, O.
Marshall Furnace Co., Marshall, Mich.
●Marshalltown Mfg. Co., 901 E. Nevada St., Marshalltown, Ia.
Martin, J. O., and C. U., 647 Minna St., San Francisco
Martin Metal Mfg. Co., 900 E. 2nd St., Wichita, Kan.
Martin-Parry Corp., W. Market St., York, Pa.
Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia, Pa.
Marvelaire Corp., 1827 Pontius Ave., West Los Angeles.
Mason & Sons, F. E., Batavia, N. Y.
Masonite Corp., 111 W. Washington St., Chicago, Ill.
Masonite Corp., Cellufoam Products Div., 6565 S. Lavergne Ave., Chicago.
Master Electric Co., 100 Davis Ave., Dayton, O.
Master Welders, 1429 Virginia St., Kansas City, Mo.
Matthiessen & Hegeler Zinc Co., LaSalle, Ill.
Maurath, Inc., 7309 Union Ave., Cleveland, O.
●Maurey Mfg. Corp., 2915 S. Wabash Ave., Chicago.
Maxim Silencer Co., 410 Asylum St., Hartford, Conn.
Mayfair Furnace Co., 1118 N. Orange Grove Ave., Hollywood, Cal.
May-Fiebeger Co., S. 21st St., Newark, O.
Mayflower Air Conditioners, Inc., Duluth Ave. & E. Seventh St., St. Paul, Minn.
Mayflower Oil Burner Corp., 5002 Hudson Blvd., West New York, N. J.
May Oil Burner Corp., Maryland Ave. & Oliver St., Baltimore, Md.
Maysteel Products, Inc., Horicon St., Mayville, Wis.
Maze Co., W. H., 1207 Water St. Peru Ill.

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Medart Co. 3500 DeKalb St., St. Louis, Mo.
Meier Electric & Machine Co., 3525 E. Washington St., Indianapolis, Ind.
Melbye Bros., Inc., 3204 N. Oakley Ave., Chicago, Ill.
Mellish & Murray Co., 1715 Carroll Ave., Chicago, Ill.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia, Pa.
●Mercoid Corp., 4201 Belmont Ave., Chicago, Ill.
Meriam Co., 1955 W. 112th St., Cleveland.
Mesker & Co., Geo. L., 400 N. W. First St., Evansville, Ind.
Metal Door & Trim Co., La Porte, Ind.
Metal Marker Co., 1380 E. 40th St., Cleveland, O.
Metal & Thermit Corp., 120 Broadway, New York City.
Metalizing Co., 1351 E. 17th St., Los Angeles, Cal.
Metalace Corp., 60 K St., South Boston, Mass.
Metal Stamping & Mfg. Co., East 168th & Waterloo Rd., Cleveland.
Metals Coating Co. of America, 495 N. Third St., Philadelphia, Pa.
Metropolitan Refining Co., 23 50th Ave., Long Island City, N. Y.
Metzner Stove Repair Co., 515 Wyandotte, Kansas City, Mo.
●Meyer & Bro. Co., F., 1311-13 S. Adams St., Peoria, Ill.
●Meyer Furnace Co., 1300 S. Washington St. Peoria, Ill.
Meyer Mfg. Co., 4823 Wabash Ave., Detroit.
●Michigan Tank & Furnace Corp., 14101 Prairie Ave., Detroit, Mich.
Micro Products Co., 20 N. Wacker Dr., Chicago.
Micro-Westco, Inc., Bettendorf, Ia.
Middleton Mfg. & Sales Co., 125 N. First St., Minneapolis.
Midwest Aluminum Products, Inc., 123 E. Pittsburgh Ave., Milwaukee, Wis.
Midwestern Supply Co., 314 Stanley Terrace, Chicago.
Milburn Co., Alexander, 1435 W. Baltimore St., Baltimore.
●Milcor Steel Co., 4117 W. Burnham St., Milwaukee, Wis.
Miller & Doing, Inc., 58 York St., Brooklyn, N. Y.
Miller & Son, C. Arthur, 202-204 S. Main St., Elmira, N. Y.
Miller Electric Mfg Co., Inc., 905 N. Meade St., Appleton, Wis.
Miller Floor Furnace Co., 741 E. 14th St., Oakland, Cal.
Miller Range & Furnace Co., Wm., 810-812 Main St., Cincinnati, O.
Miller Rubber Co., Inc., 1247 S. High St., Akron, O.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mill-Rose Co., 2498 E. 79th St., Cleveland, O.
Mills Novelty Co., 4110 W. Fullerton Ave., Chicago, Ill.
Milwaukee Brush Mfg. Co., 2236 N. 30th St., Milwaukee.
Milwaukee Gas Specialty Company, 2025 W. Clybourn, Milwaukee.
Mineral Insulation Co., 103rd & S. West Highway, Chicago Ridge, Ill.
Minfelt Insulation Co., 2288 Albion St., Toledo.
Minneapolis Automatic Draft Regulator Co., 506 Produce Exchange Bldg., Minneapolis, Minn.
●Minneapolis-Honeywell Regulator Co., 2726 Fourth Ave., S. Minneapolis, Minn.
Minn-Kota Foundry & Mfg. Co., 201 Second St., N. Fargo, N. D.
Minster Machine Co., Minster, O.
Misener Mfg. Co., Inc., 326 E. Washington St., Syracuse, N. Y.
Mississippi Glass Company, 220 Fifth Ave., New York City.
Mission Water Heater Co., 7101 McKinley Ave., Los Angeles.
Mitchell & Smith, Inc., 9469 Copeland Ave., Detroit.
Model Mfg. Co., 316 E. Main St., Richmond, Va.
Modern Engineering Co., 3411 Pine Blvd., St. Louis, Mo.
Modern Equipment Corp., Defiance, Ohio.
ModernAire Engineering Co., 107 S. W. Second Ave., Des Moines, Ia.
Modine Mfg. Co., 17th St., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill, N. Y.
Mohler Co., J. K., The, 151 Church Ave., Ephrata, Pa.
Mojonnier Brothers Co., 4601 W. Ohio St., Chicago.
Moloch Foundry & Machine Co. Kaukauna, Wis.
Monarch Furnace Fittings Manufacturers, 2240 W. 49th St., Chicago, Ill.
Monarch Heating Co., 4661 Alger St., Los Angeles.
Monarch Mfg. Works, Inc., Salmon & Westmoreland Sts., Philadelphia, Pa.
Moncrief Furnace Co., P. O. Box 1673, Atlanta, Ga.
Moncrief Furnace & Manufacturing Co., Inc., 3903 Main St., Dallas, Texas.
Monitor Controller Co., 51 S. Gay St., Baltimore, Md.
●Monmouth Products Co., 1929-41 East 61st St., Cleveland, O.
Montag Stove & Furnace Works, 2011 N. Columbia Blvd., Portland, Ore.
Montgomery Brothers, 61 Fremont St., San Francisco, Cal.
Moore Corp., Benton St., Joliet, Ill.
Moran Flexible Steam Joint Co., 217 W. Main St., Louisville, Ky.
Morris Machine Works, 31 E. Genesee St., Baldwinsville, N. Y.
Mortell Co., J. W., 310 S. Michigan Ave., Chicago, Ill.
Motorstoker Div., Hershey Machine & Foundry Co., Manheim, Pa.
Motor Wheel Corporation, Duo-Therm Division, Lansing, Mich.
Mountain States Equipment Co., 1238 Speer Blvd., Denver, Colo.
●Mt. Vernon Furnace & Mfg. Co., Mt. Vernon, Ill.
Mueller Brass Co., Lapeer Ave., Port Huron, Mich.
●Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee, Wis.
Mullins Mfg. Corp., Warren, O.
Muncie Gear Works, Inc., N. Vine St., Muncie, Ind.
Mundet Cork Corp., 450 7th Ave., New York City.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City, N. J.
Munn and Steele, Inc., 130 Lister Ave., Newark, N. J.
Murray Corporation of America, 7700 Russell St., Detroit.
Murray Tile Co., Cloverport, Ky.
Myers & Bro. Co., The F. E., Ashland, O.
Myers Electric Co., 410 Third Ave., Pittsburgh, Pa.

N

Nash Engineering Co., South Norwalk, Conn.
Nash Refrigeration Co., Inc., Summit, New & Bleecker Sts., Newark, N. J.
National Airoil Burner Co., 1284 E. Sedgley Ave., Philadelphia.
National Brass & Copper Co., Inc., 518 Grant Bldg., Lisbon, Ohio.
National Engineering Products, Inc., Commerce & Savings Bldg., Washington, D. C.
National Fireproofing Corp., 202 E. Ohio St., N. S., Pittsburgh, Pa.
National Foundry & Furnace Co., Station "B," Dayton, O.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Iron Works, Foot of 7 Ave., San Diego, Cal.
National Lead Co., 111 Broadway, New York City.
National Lock Co., Inc., Rockford, Ill.
National Machine Tool Co., 1536 Clark St., Racine, Wis.
National Machine Works, 122 S. Michigan Ave., Chicago, Ill.
National Mfg. Corp., 160 Fillmore Ave., Tonawanda, N. Y.
National Manufacturing & Engineering Co., 416 Stephenson Bldg., Detroit.
National Screw & Mfg. Co., 2440 E. 75th St., Cleveland, O.
National Sheet Metal Co., 1617-1629 Water St., Peru, Ill.
National Stainless Clip Corporation, 51 Chambers St., New York City.
National Standard Air Products Co., 325 W. Huron St., Chicago.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Steel Corp., Grant Bldg., Pittsburgh.
National Super Service Co., 1944 N. 13th St., Toledo, O.
Naylor Corp., Air Cond. Div., 1230 E. 92nd St., Chicago, Ill.
Neemes Foundry, Inc., 286 First St., Troy, N. Y.
Nelson Co., 2604 4th Ave., Detroit, Mich.
Nelson Corp. Herman, 1824 Third Ave., Moline, Ill.
Nelson Mfg. Co., B. F., Cor. Main & Marshall Sts., N. E., Minneapolis, Minn.
Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
New Departure Div. General Motors Sales Corp., Bristol, Conn.
New Haven Copper Co., Seymour, Conn.
New Jersey Zinc Sales Co., The, 160 Front St., New York City.
Newman Brothers, Inc., 662-670 W. 4th St., Cincinnati, Ohio.
New Mission Htg. & Vent. Co., 3401 Mission St., San Francisco.
New Monarch Machine & Stamping Co., 406 S. W. 9th St., Des Moines, Ia.
Newport Rolling Mill Co., The, Div. of The Andrews Steel Co., 9th & Lowell Sts., Newport, Ky.
New York Blower Co., 3155 Shields Ave., Chicago, Ill.
●New York Trade School, 322 E. 67th St., New York City.
Niagara Blower Co., 6 E. 45th St., New York City.
●Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y.
Nicholson & Co., W. H., 12 Oregon St., Wilkes-Barre, Pa.
Niles Rolling Mill Co., Niles, O.
●Norge Heating & Conditioning Div., Borg-Warner Corp., 670 E. Woodbridge St., Detroit, Mich.
Norma-Hoffman Bearings Corp., Stanford, Conn.
Norman Sheet Metal Mfg. Co., W. F., 212-236 N. Cedar St., Nevada, Mo.
Norristown Magnesia & Asbestos Co., Washington St., Below Ford St., Norristown, Pa.
North Bangor Slate Co., Bangor, Pa.
Northern Blower Co., 6409 Barberton Ave., Cleveland, O.
Northern Furnace & Supply Co., Billings, Mont.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria, Ill.
Northern Weatherstrip Co., 367 S. 1st Ave., E., Duluth, Minn.
●Northwestern Stove Repair Co., 662 W. Roosevelt Rd., Chicago, Ill.
Nortmann-Duffke Co., 2740 S. 32nd St., Milwaukee, Wis.
Norwin Co., East Album St., Freeport, Ill.
Norwood Engineering Co., N. Maple St., Florence, Mass.
Nugent Sons, Inc., Thos., 223 E. 80th St., New York City.
Nu-Way Corp., The, 2416 Fourth Ave., Rock Island Ill.

O

Oakland Foundry Co., Avenue A & L & N Tracks, Belleville, Ill.
O'Brien Varnish Co., South Bend, Ind.

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Ohio Electric Mfg. Co., 5910 Maurice Ave., Cleveland, O.
Ohio Foundry and Manufacturing Co., Steubenville, O.
Ohio Pipe Bending & Machine Co., 2900-2910 Trent Ave., Cleveland.
●Ohio Products Co., 16507 Lucille Ave., Cleveland, O.
Ohio Welder Co., Middlefield, O.
Ohio Wire Products Co., 219 W. Third St., Dover, O.
Ohl & Co., Geo. A., 151-161 Oraton St., Newark, N. J.
Ohmlac Paint & Refining Co., 6550 S. Central Ave., Chicago.
O'Keefe & Merritt Co., 3700 E. Olympic Blvd., Los Angeles.
Olsen Manufacturing Co., The C. A., Elyria, O.
Omaha Stove Repair Works, 1206 Douglas St., Omaha, Nebr.
Orbon Stove Co., L. & N. and Sycamore St., Belleville, Ill.
"Original" Metal Flanging Machine Works, 952 20th Ave., Seattle, Wash.
Ormsby-Osterman Company, 6625 Delmar Blvd., St. Louis.
●Osborn Co., J. M. & L. A., 1541 E. 38th St., Cleveland, O.
Osborn Mfg. Co., 5401 Hamilton Ave, Cleveland, O.
Otis Steel Co., 3341 Jennings Rd., Cleveland, O.
OverSpred Stoker Co., Fulton, Jackson & Jefferson Sts., Ottawa, Ill.
Owen-Dyneto Div. USL Battery Corp., Syracuse, N. Y.
●Owens-Corning Fiberglas Corp., Second National Bank Bldg., Toledo, O.
Ozone Air Company, 928 Cherry St., S. E., Grand Rapids, Mich.
Ozo-Ray Process Corp., 400 N. Sangamon St., Chicago.

P

●Pacific Gas Radiator Co., Roseberry and Walter Sts., Huntington Park, Cal.
Pacific Lumber Co., 100 Bush St., San Francisco, Cal.
Packham Crimper Co., Oak St. & N. Y. C. Depot, Mechanicsburg, O.
Page Steel & Wire Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2951 W. Carroll Ave., Chicago.
Palmer Co., Norwood, Cincinnati, O.
Palmer Electric Co., 20 Sproat St., Detroit, Mich.
Palmer's Manufacturing Corp., Phoenix, Ariz.
Pan American Engineering Company, 820 Parker St., Berkeley, Cal.
Pangborn Corp., Pangborn Blvd., Hagerstown, Md.
Par Appliances, Inc., Affiliated with LaCrosse Tractor Co., LaCrosse, Wis.
Paragon Electric Co., 37 W. Van Buren St., Chicago, Ill.
Paragon Oil Burner Corp., 75 Bridgewater St., Brooklyn, N. Y.
Park City Cornice Works, Inc., 56 McKinley Ave., Bridgeport, Conn.
Parker Appliance Co., 17325 Euclid Ave., Cleveland.
●Parker-Kalon Corp., 190 Varick St., New York City.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Patent Novelty Co., 312 Eighth St., Fulton, Ill.
Patten Co., J. V., 500 DeKalb Ave., Sycamore, Ill.
Patterson Foundry & Machine Co., East Liverpool, O.
●Payne Furnace & Supply Co., 338 N. Foothill Rd., Beverly Hills, Cal.
Peabody Engineering Corp., 580 Fifth Ave., New York City.
Peacard Co., M. A., 195 Dudley St., Boston.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co. 4th St. & Erie Ave., Philadelphia, Pa.
Peerless Electric Co., 2000 W. Market St., Warren, O.
●Peerless Foundry Co., 1853 Ludlow Ave., Indianapolis, Ind.
Peerless Mfg. Corp., 1400 W. Ormsby St., Louisville, Ky.
Peerless of America, Inc., 515 W. 35th St., Chicago, Ill.
Peerless Oil Burner Co., Inc., 3926 Main St., Kansas City, Mo.
Peerless Pump Div., Food Machinery Co., Massillon, O.
Pels & Co., Inc., Henry, 90 West St., New York City.
Pencilsharp Awl & Tool Co. 1423-25 E. Illinois St., Evansville, Ind.
●Peninsular Stove Co., 2699 Gratiot Ave., Detroit, Mich.
●Penn Boiler & Burner Mfg. Corp., 359 N. Market St., Lancaster, Pa.
Penn Cooling Tower Wks., 1337 Nixon St., Pittsburgh, Pa.
●Penn Electric Switch Co., Box 556, Goshen, Ind.
Penn Ventilating Co., 2812 Richmond St., Philadelphia, Pa.
Pennsylvania Engineering Works, 526 S. Jefferson St., New Castle, Pa.
Pennsylvania Furnace & Iron Co., P. O. Box 269, Warren, Pa.
Pentecost & Craft Co., 429 Wabash Ave., Terre Haute, Ind.
Peoples Oil Burner Co., 466 W. Superior St., Chicago.
Perfectaire Corp., 1102 N. Charles St., Baltimore, Md.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield, Mass.
Perfection Stove Co., 7609 Platt Ave., Cleveland, O.
Perfex Corp., 415 W. Oklahoma Pl., Milwaukee, Wis.
Perham Products, Inc., 133 N. Wacker Drive, Chicago.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Perkinson & Brown, 412 N. Wolcott Ave., Chicago.
Pernot & Rich, Inc., 2546 San Fernando Rd., Los Angeles.
Peterson "Freezem" Mfg. & Sales Co., 316 Southwest Blvd., Kansas City, Mo.
Petroleum Heat & Power Co., Stamford, Conn.
Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.
Pfeiffer, Wm., 416 Greenwich St., New York City.
Pfening Co., Fred D. 1075 W. 5th Ave., Columbus, O.
Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York City.
Phoenix Ice Machine Co., 2711 Church St., Cleveland.
Phelps Mfg. Co., 801 Thomas St., Little Rock, Ark.
Philadelphia Gear Co., Erie Ave. & G St., Philadelphia.
Philadelphia Machinery Co., 118 N. 6th St., Philadelphia.
Philco Radio & Television Corp., Tioga and C Streets, Philadelphia.
Piatt Products Corp., 1149 S. Pennsylvania Ave., Lansing, Mich.
Pier Equipment Mfg. Co., 1440 Milton St., Benton Harbor, Mich.
Pilley Packing and Flue Brush Mfg. Co., 606 S. 3rd St., St. Louis, Mo.
Pioneer Heat Regulator Division, Master Electric Co., 100 Davis Ave., Dayton, Ohio.
Pioneer Manufacturing Co., 714 Oakland N. E., Cedar Rapids, Ia.
Pioneer Roofing & Sheet Metal Co., 226 W. Main St., Muskogee, Okla.
Pioneer Water Heater Co., 3005 Andriba St., Los Angeles.
Pittsburgh Furnace Parts Co., 109 Federal St., Pittsburgh.
Pittston Stove Co., P. O. Box 29, Pittston, Pa.
Plant Rubber & Asbestos Works, 537 Brannan St., San Francisco.
Plastergon Wall Board Co. Philadelphia Ave., Buffalo, N. Y.
Plastic Products Co., 6475 Georgia Ave., Detroit, Mich.
Pleasantaire Corp., 1623 Connecticut Ave., Washington, D. C.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago, Ill.
Plymouth Cordage Co., Court St., North Plymouth, Mass. (Anderson Products, Inc., Cambridge, Mass., National Sales Agents.)
Plymouth Industries Inc., 1932 Harrison Ave., Plymouth, Ind.
Pocahontas Fuel Corp., Stoker Div., 1190 E. 152nd St., Cleveland.
●Poe, Ralph W., 44 White Ct., Canton, Ill.
Polk Mfg. Co., 2021-23 Winnebago St., Madison Wis.
Pomona Pump Co., 206 E. Commercial St., Pomona, Cal.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore.
Portland Stove Fdry. Co., Portland, Me.
Potomac Mfg. Co., 316 S. 10th St., Philadelphia, Pa.
Power King Tool Co., 310 E. Market St., Warsaw, Ind.
Powers Regulator Co., 2720 Greenview Ave., Chicago, Ill.
Practical Instrument Co., 2713 N. Ashland Ave., Chicago.
Prat-Daniel Corporation, Port Chester, N. Y.
Precision Thermometer & Instrument Co., 1434 Brandywine St., Philadelphia, Pa.
Preferred Utilities Manufacturing Corp., 33 W. 60th St., New York City.
●Premier Furnace Co., Box 150, Dowagiac, Mich.
Premier Metal Etching Co., 21-03 44th Ave., Long Island City.
Presstite Engineering Co., 3900 Chouteau St., St. Louis, Mo.
Pressure Oil Burners, Inc., 55 N. Broad St., York Pa.
Propellair, Inc., 1345 Lagonda Ave., Springfield, O.
Pryne & Co., Inc., 1245 E. 33rd St. Los Angeles, Cal.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis, Mo.
Pulvokol, Inc., 406 S. Second Ave., Minneapolis, Minn.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago, Ill.
Pyramid Metals Co., 1334 N. Wells St., Chicago.
Pyrolite Products Co., 1221-31 W. 74th St., Cleveland, O.

Q

Quaker Mfg. Co., 223 W. Erie St., Chicago, Ill.
Quickwork Co., 400 W. Madison St., Chicago, Ill.
Quiet Heet Burner Co., 1555 Coney Island Ave., Brooklyn, N. Y.
Quimby Pump Co., Inc., 340 Thomas St., Newark, N. J.

R

R-S Products Corp., 4530 Germantown Ave., Philadelphia, Pa.
Racine Stoker Mfg. Co., 1014 Eighth St., Racine, Wis.
Radiator Specialty Co., Charlotte, N. C.
Rafter Machine Co., 259 Stephen St., Belleville, N. J.
Ramey Mfg. Co., 243 N. 5th St., Columbus, O.
Ramtite Co., Division of S. Obermayer Co., 2563 W. 18th St., Chicago, Ill.
Ranco Inc., 601 W. Fifth Ave., Columbus, O.
●Randall Graphite Products Corp., 609 W. Lake St., Chicago.
Ravenna Furnace & Heating Co., Ravenna, O.
Rawlplug Co., Inc., The, 93 Lafayette St., New York City.
Ray Oil Burner Co., 401-499 Bernal Ave., San Francisco, Cal.
Red Jacket Mfg. Co., Davenport, Ia.
Reed Unit-Fans, Inc., 811 St. Charles St., New Orleans, La.
Reeves Steel & Mfg. Co., Dover, O.
Refractory & Insulation Corp. 381 Fourth Ave., New York City.
Refrigeration Appliances, Inc., 923 W. Lake St., Chicago, Ill.
Refrigeration Economics Co., Inc., 1232 Second St. N. E., Canton, Ohio.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester, N. Y.
●Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo, O.

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Reif-Rexoil, Inc., 37 Carroll St., Buffalo N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis, Ind.
Reliable Gas Products Co., 1020 Second Ave., S. W., Cedar Rapids, Ia.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
●Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland, O.
Reliance Refrigeration Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Rempe Co., 340 N. Sacramento Ave., Chicago, Ill.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
●Republic Steel Corp., Republic Bldg., Cleveland, O.
Research Corp., 405 Lexington Ave., New York City.
Research Products Corporation, 1011 E. Washington Ave., Madison, Wis.
Revere Copper and Brass Incorporated, 230 Park Ave., New York City.
Reynolds Electric Company, 2685 W. Congress St., Chicago.
Reynolds Manufacturing Co., 412 Prospect N. E., Grand Rapids, Mich.
Rex Clay Products Company, 14414 Dexter Blvd., Detroit.
Reznor Mfg. Co., Mercer, Pa.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Ribside Furnace Co., 119½ Clinton St. Wausau, Wis.
Richards-Wilcox Mfg. Co., Third St., Aurora, Ill.
Richardson & Boynton Co., 274 Madison Ave., New York City.
Richmond Fireproof Door Co., Richmond, Ind.
Richmond Radiator Co., Inc., Uniontown, Pa.
●Riester & Themacher Co., 1526 W. 25th St., Cleveland.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Risdon Stoker Corp., 6355 Rainier Ave., Seattle, Wash.
Rising & Nelson Slate Co., West Pawlet, Vt.
Rival Strap Corporation, 308 W. 20th St., New York City.
Roan Mfg. Co., 1220 Washington Ave., Racine, Wis.
Robbins & Myers, Inc., 1345 Lagonda Ave., Springfield, O.
Roberts-Gordon Appliance Corp., 137 Arthur St., Buffalo.
Roberts-Hamilton Co., 707-715 S. Third St., Minneapolis.
Roberts Tube Works, 2500 Military Ave., Detroit.
●Robertson, F. L., 56 Rano St., Buffalo, N. Y.
Robertson Co., H. H., 2400 Farmers Bank Bldg. Pittsburgh.
Robinson Furnace Co., 213 W. Hubbard St., Chicago.
Rochester Lead Works, Inc., 380 Exchange St., Rochester, N. Y.
Rochester Mfg. Co., Rochester, N. Y.
●Rock Island Register Co., 2425 Fifth Ave., Rock Island, Ill.
Rock Island Stove Co., 200 Fourth St., Rock Island, Ill.
Rock Products Co., 150 Fourth Ave., Nashville, Tenn.
Rockford Brass Works, Rockford, Ill.
Rock River Machine Co., Inc., N. Main St., Janesville, Wis.
Rockwood Mfg. Co., 1801 English Ave., Indianapolis, Ind.
Rock Wool Products Co., Inc., P. O. Box 276, Wabash, Ind.
Roebling's Sons Co., John A., 640 S. Broad St., Trenton, N. J.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg Sta., Pittsburgh.
Roller Bearing Co. of America, Trenton, N. J.
Rome-Turney Radiator Co., Canl St., Rome, N. Y.
Root-Connersville Blower Corp., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus Ave., N. S., Pittsburgh, Pa.
Rotary Mfg. Co., 5718 Long Beach Ave., Los Angeles, Cal.
●Round Oak Co., Dowagiac, Mich.
Roxalin Flexible Lacquer Co., Inc., 800 Magnolia Ave., Elizabeth, N. J.
Royal Air Conditioning Equipment, 1900 Alameda Blvd., Compton, Cal.
Royal-Apex Mfg. Corp., 62 Schenectady Ave., Brooklyn, N. Y.
Royal Ventilator Co., 415 Locust St., Philadelphia, Pa.
Royersford Foundry & Machine Co., Royersford, Pa.
Ruberoid Co., The, 500 Fifth Ave., New York City.
●Ruby Chemical Co., 74 McDowell St., Columbus, O.
Rudy Furnace Co., Dowagiac, Mich.
Ruggles-Klingemann Mfg. Co., 4 Foster Ct, Salem, Mass.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee, Wis.
Russell Electric Co., 342 W. Huron St., Chicago, Ill.
Russell Co., F. C., 6535 Euclid Ave., Cleveland.
Russell Mfg. Co., John M., Naugatuck, Conn.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
●Rybolt Heater Co., Miller St., Ashland, O.
●Ryerson & Son, Inc., Joseph T., 2558 W. 16th St., Chicago.
Ryniker Sheet Metal Works, Inc., 122-124 N. 25th St., Billings, Mont.

S

S K F Industries, Inc., Front St. & Erie Ave., Philadelphia, Pa.
Saino Mfg. Co., Inc., F. L., 70 W. Colorado Ave., Memphis, Tenn.
St. Charles Mfg. Co., St. Charles, Ill.
St. Clair Foundry Corp., Beech & Wilson Sts., Centralia, Ill.
St. Louis Blow Pipe & Heater Co., 1954 N. Ninth St., St. Louis.
●St. Louis Furnace Mfg. Co., 2901 Elliot Ave, St. Louis, Mo.
●St. Louis Tool Co., 2319 N. 9th St., St. Louis.
St. Paul Corrugating Co., Wabash & Water Sts., St. Paul, Minn.
Sall Mountain Co., 176 W. Adams St., Chicago, Ill.
Sallada Mfg. Co., 3816 Grand Ave., S., Minneapolis, Minn.
Sampsel Time Control, Inc., Mendota, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Sauereisen Cements Co., 5118 Main St., Sharpsburg Station, Pittsburgh, Pa.
Savage Co., W. J., 912 W. Clinch Ave., Knoxville, Tenn.
Schaefer Brush Mfg. Co., 117 W. Walker St., Milwaukee.
Schatz Mfg. Co., Fairview, Poughkeepsie, N. Y.
Schecter Brothers Co., Front & Cumberland Sts., Philadelphia, Pa.
Schill Mfg. Co., Mansfield St., Crestline, O.
Schneible Co., Claude B., 3951 Lawrence Ave., Chicago.
Schoedinger Co., F. O., 322-358 Mt. Vernon Ave., Columbus, O.
Schundler & Co., Inc., F. E., Insulation Div., 504 Railroad St., Joliet, Ill.
Schwab Furnace & Mfg. Co., 193 S. Second St., Milwaukee.
Schwab Safe Co., Lafayette, Ind.
●Schwitzer-Cummins Co., 1128 E. 10th St., Indianapolis, Ind.
Scientific Instrument Co., 531-35 W. Larned St., Detroit.
Scott-Newcomb, Inc., 1929 Pine St., St. Louis, Mo.
●Scovill Mfg. Co., Morency-Van Buren Div., Prairie Ave., Sturgis, Mich.
●Scully Steel Products Co., 1319 W. Wabansia, Chicago.
Sealkote Corp., 40 S. Clinton St., Chicago, Ill.
Seamlex Co., 5-18 48th Ave., Long Island City, N. Y.
Season-Aire Corporation of America 20 Bartlett St., Detroit.
Security Stove & Mfg. Co., 1630 Oakland, Kansas City, Mo.
Seep-Lok Flashing Co., Inc., 63 Hawthorne Ave., Yonkers, N. Y.
Self-Vulcanizing Rubber Co., Inc., 605 W. Washington Blvd., Chicago, Ill.
Seneca Wire & Mfg. Co., Fostoria, Ohio.
Sentry Mfg. Co., N. E. Cor. 13th & Grace Sts., Omaha, Nebr.
Servel, Inc., Electric Ref. & Air Cond. Div., 119 Morton Ave. Evansville, Ind.
Service Machine Co., 750-760 Broadway, Elizabeth, N. J.
Shafer Bearing Corp., 35 E. Wacker Dr., Chicago.
●Shamblen Furnace Parts Co., 231-39 First Ave., Pittsburgh.
Shakeproof Lock Washer Co., 2501 N. Keeler Ave., Chicago.
Shallcross Co., 48th & Grays Ferry Rd., Philadelphia.
Sharon Steel Corp., Sharon, Pa.
Shedlov Oil Burners, Inc., 717 Third Ave., S. Minneapolis.
Sheer Co., H. M., 2nd & Hampshire Sts., Quincy, Ill.
Sheet Metal Products Co., 320 S. Commercial St., Peoria, Ill.
Sheldon Slate Products Company, Main St., Granville, N. Y.
Sherwin-Williams Co., 101 Prospect Ave., N. W., Cleveland.
Shreveport Engineering Co., Inc., 1241 Dalzell St., Shreveport, La.
Sight Feed Generator Co., 14 N. Tenth St., Richmond, Ind.
Signal Electric Mfg. Co., Menominee, Mich.
Silent Glow Oil Burner Corp., 1477 Park St., Hartford, Conn.
Silent Sioux Oil Burner Corp., Orange City, Ia.
Simplex Manufacturing Co., 200 North Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 21 West St., New York City.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis, Ind.
Sioux City Foundry and Boiler Co., East 8th & Division Sts., Sioux City, Iowa.
Sisalkraft Co., The, 205 W. Wacker Dr., Chicago.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skilsaw, Inc., 5033 Elston Ave., Chicago, Ill.
Skinner Co., E. W., 402 Pearl St., Fitchburg, Mass.
●Skuttle Co., J. L., 999 Franklin St., Detroit, Mich.
Sly Mfg. Co., W. W., 4736 Train Ave., Cleveland, O.
Smidth & Co., F. L., 225 Broadway, New York City.
Smith & Kanzler, Inc., 516 Lidgerwood Ave., Elizabeth, N. J.
Smith, Inc., Winfield H., Eaton St., Springville, N. Y.
Smith Heater Co., Peter, 6209 Hamilton St., Detroit, Mich.
Smith Welding Equipment Corp., 2619-33 Fourth St., S. E., Minneapolis, Minn.
Smooth-on Mfg. Co., 568-574 Communipaw Ave., Jersey City, N. J.
Snap-On Mfg. Co., 1028 Blue Island Ave., Chicago, Ill.
Snap-On Tools Corp., Kenosha, Wis.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit, Mich.
Sonner Burner Co., 6th & Andrews, Winfield, Kan.
Soss Manufacturing Co., Roselle, N. J.
South Bend Air Products, Inc., 322 E. Colfax, South Bend, Ind.
Southbridge Roofing Co., Inc., Hartwell & Chapin Sts., Southbridge, Mass.
Southern States Iron Roofing Co., Stiles Ave., Savannah, Ga.
Southworth Machine Co., 30 Warren Ave., Portland, Maine.
Specialty Converters, Inc., East Braintree, Mass.
Speedway Mfg. Co., 1854 S. 52nd Ave., Cicero, Ill.
Spencer Heater Division Aviation Mfg. Corp., 164 Park St., Williamsport, Pa.
Spencer Thermostat Co., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 484 New Park Ave., Hartford, Conn.
Spoehrer-Lange Co., 3723 Commonwealth St., St. Louis.
Spray Engineering Co., 114 Central St., Somerville, Mass.
Spraying Systems Co., 4021 W. Lake St., Chicago, Ill.

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Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago, Ill.
Spray-Wheel Air Conditioners, Inc., 1320 19th St., Denver, Colo.
Sprout-Waldron & Co., Muncy, Pa.
Spun Steel Corp., 2037 Dueber Ave., S. W., Canton, O.
Square D Co., 6060 Rivard St., Detroit, Mich.
Stafford Co., N., 1st Ave. & 53rd St., Brooklyn, N. Y.
Standard Air Conditioning, Inc., 50 W. 40th St., New York City.
Standard Asbestos Mfg. Co., 820-22 W. Lake St., Chicago, Ill.
Standard Engineering Works, 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., South, Detroit, Mich.
Standard Furnace & Supply Co., 407-13 S. 10th St., Omaha, Nebr.
Standard Galvanizing Co., 2619 W. Van Buren St., Chicago.
Standard Heating & Radiator Co., 704 Second Ave., Pittsburgh, Pa.
Standard Lime & Stone Co., 2004 First National Bank Bldg., Baltimore, Md.
Standard Rolling Mills, Inc., 143 Jewel St., Brooklyn, N. Y.
●Standard Stamping & Perforating Co., 3131 W. 49th Pl., Chicago, Ill.
Standard Stoker Corporation, New Albany, Ind.
Stanley Electric Tool Div., The Stanley Works, Elm St., New Britain, Conn.
Stanley Mfg. Co., East Monument Ave., Dayton, O.
Stanley Tools, New Britain, Conn.
Stanton Heater Co., Martins Ferry, O.
Star Electric Motor Co., 197 Grove St., Bloomfield, N. J.
Star Radiator Co., 649 Ceres Ave., Los Angeles, Cal.
Starr Piano Co., Richmond, Ind.
Staynew Filter Corp., 25 Leighton Ave., Rochester, N. Y.
Steel and Tubes Div. Republic Steel Corp., 224 E. 131st St., Cleveland.
Steel Products Engineering Co., Columbia St. at Dakota Ave., Springfield, O.
Steinhorst & Sons, Inc., Emil, 612 South St., Utica, N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Stephens Mfg. Co., Tulsa, Okla.
Sterling Electric Motors, Inc., 5401 Telegraph Rd., Los Angeles.
Sterling Foundry Co., Sterling, Ill.
Ster-Na-Man Fdry. Co., 441 Williams St., Springfield, Ill.
Stewart Foundry, O. S., 887 E. 67th St., Cleveland, O.
Stewart Ice Machine Co., 1046 East 22nd St., Los Angeles.
Stiglitz Furnace & Foundry Co., 2007-23 Portland Ave., Louisville, Ky.
Stok-A-Fire Co., Inc., 6504 Olive St., University City, Mo.
Stokerette Mfg. Co., 4540 Ravenswood Ave., Chicago, Ill.
Stokermatic Co., 1415 S. State St., Salt Lake City, Utah.
Stoker Products, Inc., 221 W. Prairie Ave., Decatur, Ill.
Stow Mfg. Co., 400 State St., Binghamton, N. Y.
Stover Mfg. & Engine Co., N. Henderson Ave., Freeport, Ill.
Strandwitz & Co., Inc., W. J., Jefferson and Master St., Camden, N. J.
Stran-Steel Division, Great Lakes Steel Corp., 607 Shelby St., Detroit.
Stratton & Terstegge Co., 15th & Main St., Louisville, Ky.
Streamaire Co., Cincinnati, O.
Streamline Pipe & Fittings Div., Mueller Brass Co., Port Huron, Mich.
Strong-Scott Mfg. Co., Taft & Kennedy Sts., N. E., Minneapolis, Minn.
Structural Slate Co., Robinson Ave., Pen Argyl, Pa.
Sturtevant Co., B. F., Damon St., Hyde Park, Boston, Mass.
Sturtevant Mill Co., Park & Clayton Sts., Dorchester, Boston, Mass.
Summerheat Co., 406 S. Columbia, South Bend, Ind.
Sundstrand Engineering Co., 1327 Seventh St., Rockford, Ill.
Sun-Ray Oil Burner Corp., 114-02 Beach Channel Dr., Rockaway Park, N. Y.
Super Radiator Corp., 320 Plymouth Bldg., Minneapolis.
●Superior Sheet Steel Co., The, Division of Continental Steel Corp., Canton & Louisville Rd., Canton, O.
Superior Steel Corp., Grant Bldg., Pittsburgh, Pa.
Supreme Air Filter Co., 126 W. 21st St., New York City.
Supreme Electric Products Corp., 99 Mt. Hope Ave., Rochester, N. Y.
Supreme Heater & Ventilating Corp., 1911 N. Market St., St. Louis, Mo.
●Surface Combustion Corp., 2375 Dorr St., Toledo, O.
Susquehanna Engineering Co., Ninth & Iron Sts., Bloomsburg, Pa.
Sutphen & Co., J. W., 150 S. LaBrea Ave., Los Angeles, Cal.
Swaby Mfg. Co., 2335 W. Cermak Rd., Chicago, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis, Mo.
●Swartwout Co., 18615 Euclid Ave., Cleveland, O.
Swift Corp., Carl E., 31 W. 8th St., Holland, Mich.
Swift Mfg. Company, 247 McDougall Ave., Detroit, Mich.
Syncro-Flame Burner Corp., 57 North St., Willimantic, Conn.
Syracuse Fire Door Corp., 900 Canal St., Syracuse, N. Y.

T

Taco Heaters, Inc., 342 Madison Ave., New York City.
Tagliabue Mfg. Co., C. J., Park & Nostrand Aves., Brooklyn.
Tamms Silica Co., 228 N. La Salle St., Chicago, Ill.
Tannewitz Works, 315 Front Ave., N. W., Grand Rapids, Mich..
Taylor Co., N. & G., Div. Republic Steel Co., Cumberland, Md.
Taylor Engineering Co., Metropole Hotel, Cincinnati.
Taylor-Hall Welding Corp., 99 Hope Ave., Worcester, Mass.
Taylor Instrument Companies, 95 Ames St., Rochester, N. Y.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Coatings, Inc., 261 Water St., Brooklyn, N. Y.
Tecumseh Products Co., Tecumseh, Mich.
Tem Products Co., Midland, Pa.
●Tennessee Coal, Iron & Railroad Co., Brown-Marx Bldg., Birmingham, Ala.
Tennessee Enamel Mfg. Co., Nashville, Tenn.
Thatcher Furnace Company, 39 St. Francis St., Newark, N. J.
Therminsul Corp., 1603 Fulford St., Kalamazoo, Mich.
Thiele Furnace Co., Inc., 1011 Fayette St., Indianapolis, Ind.
Thompson & Company, Box 6757, Pittsburgh, Pa.
Thomson-Gibb Electric Welding Co., 161 Pleasant St., Lynn, Mass.
ThruBond Flashing Corp., 525 E. 136th St., New York City.
Tierney Rotor Ventilator Co., 239 4th Ave., S., Minneapolis.
Tiffin Art Metal Co., Broad & Second Ave., Tiffin, O.
Tilco-Fin, Inc., 58 Second Ave., Brooklyn, N. Y.
Timken Roller Bearing Co., Canton, O.
Timken Silent Automatic Div., Timken-Detroit Axle Co., 100 Clark Ave., Detroit, Mich.
●Tinnerman Products, Inc., 2038-46 Fulton Road, Cleveland.
TiteFlex Metal Hose Co., 500 Frelinghuysen Ave., Newark, N. J.
Todd Air Conditioning Co., Inc., Bonner Springs, Kan.
Todd Combustion Equipment, Inc., Ft. of 23rd St., 601 W. 26th St., New York City.
Toledo Stoker Co., 48 Blucher St., Toledo, O.
Torchweld Equipment Co., 1035 W. Lake St., Chicago, Ill.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
●Torrington Mfg. Co., 70 Franklin St., Torrington, Conn.
Townsend Co., New Brighton, Pa.
Trade-Wind Motor Fans, Inc., 1325 Maple Ave., Los Angeles.
Trane Co., The, La Crosse, Wis.
Trimount Rotary Power Co., 296 Whiting Ave., East Dedham, Mass.
Trindl, Inc., Jos. H., 2613 S. Michigan Blvd., Chicago.
Triumph Ice Machine Co., 107 E. Front St., Cincinnati, O.
Tropic-Air Stoker Co. 401 Schroyer Ave., S. W., Canton, O.
Tropical Paint & Oil Co., 1244-86 W. 70th St., Cleveland, O.
Trumbull Electric Mfg. Co., Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff & Grand Trunk R. R., Detroit.
Truscon Steel Co., Albert St., Youngstown, O.
●Tubular Rivet & Stud Co., Wollaston, Mass.
Turner & Seymour Mfg. Co., Lawton St., Torrington, Conn.
Turner Brass Works, 823 Park Ave., Sycamore, Ill..
Tuttle Air Filter Co., Inc., 1014 W. Main St., Louisville, Ky.
●Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
Twentieth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

U

Uehling Instrument Co., 473 Getty Ave., Paterson, N. J.
Una Welding, Inc., 1615 Collamer Ave., Cleveland, O.
Unified Air Conditioner Co., 322 W. Michigan St., Duluth, Minn.
Uniflow Mfg. Co., East Lake Road, Erie, Pa.
Union Steam Pump Co., S. W. Capital Avenue, Battle Creek, Mich.
Unit Heater & Cooler Co., 1002-1024 Third St., Wausau, Wis.
United American Bosch Corp., 3664 Main St., Springfield, Mass.
United Cork Companies, Central Ave. & N. J. Central R. R., Kearny, N. J.
United Electric Controls Co., 69 "A" St., South Boston.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City, N. Y.
United Motors Service, Detroit, Mich.
●U. S. Air Conditioning Corp., 2101 Kennedy St., N. E., Minneapolis, Minn.
United States Brass & Copper Co., Hyde Park Ave., Hyde Park, Mass.
United States Burner Corp., 191 Franklin Ave., Hartford, Conn.
U. S. Cistern Filter Mfg. Co., The, 509 S. McClun St., Bloomington, Ill.
U. S. Expansion Bolt Co., Inc., P. O. Box 357, York, Pa.
U. S. Electrical Motors, Inc., 200 E. Slausson Ave., Los Angeles.
United States Electrical Tool Co., 2482 W. 6th St., Cincinnati, O.
United States Gypsum Co., 300 W. Adams St., Chicago, Ill.
U. S. Machine Corporation, Lebanon, Ind.
United States Mineral Wool Co., 9 S. Clinton St., Chicago.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Radiator Corp., 1056 National Bank Bldg., Detroit, Mich.

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●United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1790 Broadway, New York City.
●United States Steel Corp., 436 Seventh Ave., Pittsburgh, Pa.
Uni-Therm Products Co., P. O. Box 83, Elyria, O.
Universal Air Filter Corp., 332 W. Michigan St., Duluth, Minn.
Universal Blower Co., 124 S. Woodward Ave., Birmingham, Mich.
●Universal Cooler Corp., 7214 Melville St., Detroit, Mich..
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Gypsum & Lime Co., 105 W. Madison St., Chicago.
Universal Utilities, P. O. Box 127, Crestline, O.
Universal Power Corp., 4300 Euclid, Cleveland, O.
●Uno Ventilator Co., 565 Lincoln Ave., Cliftondale, Mass.
Upson Co., The, Upson Point, Lockport, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica, N. Y.
Utility Fan Corporation, 2528 Santa Fe Ave., Los Angeles.

V

Vacuum Gas Burner Corp., 115 N. Union St., Olean, N. Y.
Vail Mfg. Co., 1017 Columbia Ave., Fort Wayne, Ind.
Valley Mfg. Co., Fryeville, Athol, Mass.
Van Dorn Electric Tool Co., Towson, Md.
Van Noorden Co., E., 100 Magazine St., Boston, Mass.
Vendor Slate Co., Inc., P. O. Box 204, Nazareth, Pa.
Ventilating Products Co., 2800 Cottage Grove Ave., Chicago.
Vent-O-Lite Co., 4230 W. Taylor St., Chicago, Ill.
Vermont Structural Slate Co., Fair Haven, Vermont.
Verson Allsteel Press Co., 1351 E. 93rd St., Chicago.
Vibration Eliminator Co., 2508-37th Ave., Long Island City, N. Y.
●Victor Electric Products, Inc., 2950 Robertson Road, Cincinnati, Ohio.
Victor Equipment Co., Kimball-Krogh Pump Div., 1010 E. 62nd St., Los Angeles, Cal.
Victor Oil Burner Mfg. Co., 250 Pleasant St., Hartford, Conn.
●Viking Air Conditioning Corp., 9500 Richmond Ave., Cleveland, O.
Viking Mfg. Co., Seville, O.
Viking Pump Co., 404 State St., Cedar Falls, Ia.
Viking Shear Co., 1063 19th St., Erie, Pa.
Vilter Mfg. Co., 2217 S. First St., Milwaukee, Wis.
Volcano Burner Corp., 575 E. 184th St., New York City.
Vortex Mfg. Co., 687 N. Tillamook St., Portland, Ore.
Vulcan Electric Co., Lynn, Mass.

W

Wagner, C. DeWitt, 1000 2nd St., S. E., Cedar Rapids, Ia.
Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.
Wailes Dove-Hermiston Corp., 17 E. Battery Pl., New York City.
Waldron Corp., John, New Brunswick, N. J.
Walker Mfg. & Sales Corp., 1711-1717 Penn St., St. Joseph, Mo.
Walsh Refractories Corp., 4430 N. First St., St. Louis, Mo.
Walworth Co., 60 E. 42nd St., New York City.
Ward Co., H. H., Chester, Pa.
Ward Heater Co., Ltd., 1800 W. Washington Blvd., Los Angeles, Cal.
Ward Leonard Electric Co., 37 South St., Mt. Vernon, N. Y.
●Ward Machinery Co., 564 W. Washington Blvd., Chicago.
Ward Mfg. Co., 107-11 E. Milwaukee Ave., Detroit, Mich.
Washburne & Co., E. G., 207 Fulton St., New York City.
Washington Stove Works, 3402-22 Smith Ave., Everett, Wash.
Waterloo Register Co., 2520 E. Fourth St., Waterloo, Ia.
●Waterman-Waterbury Co., 1122 Jackson St., N. E. Minneapolis, Minn.
Wattenamel Co., 7400 Archer Ave., Summit, Ill.
Waverly Heating Supply Co., 32 Union St., Boston, Mass.
Wayne Oil Burner Corp., 800 Glasgow Ave., Fort Wayne, Ind.
Wayne Pattern & Foundry Co., 236 Murray St., Fort Wayne, Ind.
Weatherhead Co., 300 E. 131st St., Cleveland, O.
Webster Engineering Co., 419 W. 2nd St., Tulsa, Okla.
Weil Pump Co., 215 W. Superior St., Chicago, Ill.
Weinman Pump Co., 290 Spruce St., Columbus, O.
Weirton Steel Co., Weirton, W. Va.
Weiss & Co., H., 113-115 Mercer St., New York City.
Weldex, Inc., 7326 McDonald Ave., Detroit, Mich.
Welding Apparatus Co., 4309 Ogden Ave., Chicago, Ill.
Wells Mfg. Corp., 315 Seventh Ave., Three Rivers, Mich.
Western Blower Co., 1800 Airport Way, Seattle, Wash.
Western Engineering & Mfg. Co., 1726 E. Washington Blvd., Los Angeles.
Western Felt Works, 4027 Ogden Ave., Chicago, Ill.
Western Furnaces, Inc., 950 Commerce St., Tacoma, Wash.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles.
Western Silicair Products, Inc., 72 S. Alameda Ave., Burbank, Cal.
Western Wire & Iron Works, Inc., 945 W. 18th Pl., Chicago.
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., East Springfield, Mass., and Cleveland.
Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark, N. J.
Westwick & Son, Inc., John, Claude & Meeker Sts., Galena, Ill.
Wheelco Instruments Co., 1933 S. Halsted St., Chicago, Ill.
Wheeling Corrugating Co., Wheeling Steel Bldg., Wheeling, W. Va.
Wheeling Metal & Mfg. Co., Box 56, Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Bldg., Wheeling, W. Va.
White & Company, Haydn F., 1740 E. 12th St., Cleveland.
●White Mfg. Co., 2362 University Ave., St. Paul, Minn.
●White-Rodgers Electric Co., 1209 Cass Ave., St. Louis, Mo.
Whiting Corp., Harvey, Ill.
Whitney Chain & Mfg. Co., Bartholomew Ave., Hartford, Conn.
●Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
●Whitney Metal Tool Co., 91 Forbes St., Rockford, Ill.
Wickwire Spencer Steel Co., 500 Fifth Ave., New York City.
Wiedemann Machine Co., 1815 Sedgley Ave., Philadelphia.
Wilder Mfg. Co., P. O. Box 189, Niles, O.
Wilhelm Co., A., 3rd & Bern Sts., Reading, Pa.
Will-Burt Co., Orrville, O.
Williams Oil-O-Matic Heating Corp., 1201 E. Bell, Bloomington, Ill.
Williams-Wallace Co., 160 Hooper St., San Francisco.
●Williamson Heater Co., 337 W. Fifth St., Cincinnati, O.
Willis Mfg. Co., Inc., 156 N. Academy St., Galesburg, Ill.
Will-Weld Mfg. Co., Inc., 600-620 S. 15th St., Omaha, Nebr.
●Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago, Ill.
Wilson Co., The H. A., 105 Chestnut St., Newark, N. J.
●Wilson, Inc., Grant, 4101 W. Taylor St., Chicago, Ill.
Wilson Products, Inc., 348 Thorn St., Reading, Pa.
Wilson Welder & Metals Co., Inc., 60 E. 42nd St., New York City.
Wing Mfg. Co., L. J., 154 W. 14th St., New York City.
Wisconsin Heating & Draft Control Co., 156 Lake Drive, Oshkosh, Wis.
●Wise Furnace Co., 101 Lincoln St., Akron, O.
●Wiss & Sons Co., J., 33 Littleton Ave., Newark, N. J.
Wittenmeier Machinery Co., 850 N. Spaulding Ave., Chicago, Ill.
●Wodack Electric Tool Corp., 4644 W. Huron St., Chicago.
Wolff Coal Saver Co., 1330 W. Congress St., Chicago, Ill.
Wolverine Blower Works, 412 Prospect Ave., Grand Rapids, Mich.
Wolverine Tube Co., 1419 Central Ave., Detroit, Mich.
Wood Conversion Co., First National Bank Bldg., St. Paul, Minn.
●Wood Industries, Inc., Gar, 7924 Riopelle St., Detroit, Mich.
Wood Steel Co., Alan, Conshohocken, Pa.
Woods-Evertz Stove Co., Springfield, Mo.
Wood's Sons Co., T. B., Fifth Ave., Chambersburg, Pa.
Woolery Machine Co., 2919 Como Ave., S. E., Minneapolis.
Woolwine Metal Products Co., Atlantic Blvd. & S. Riverside Dr., Los Angeles, Cal.
Wooster Art Wood, Inc., P. O. Box 198, Wooster, O.
Worcester Brush & Scraper Co., Div. Mason Worcester Co., 38 Austin St., Worcester, Mass.
Worthington Pump & Machinery Corp., Worthington Ave., Harrison, N. J.
Worthington Pump & Machinery Corp., Carbondale Div., Harrison, N. J.

X

XL Refrigerating Co., Inc., 1834 W. 59th St., Chicago, Ill.
X-Pando Corp., 43-15 36th St., Long Island City, N. Y.
XXth Century Heating & Ventilating Co., Ira & Edison Ave., Akron, O.

Y

Yardley Screen & Weather Strip Co., 142 Parsons Ave., Columbus, O.
Yarnall-Waring Company, Chestnut Hill, Philadelphia, Pa.
Yates-American Machine Co., Beloit, Wis.
Yeomans Bros. Co., 1433 Dayton St., Chicago, Ill.
Yoder Co., 5500 Walworth Ave., Cleveland, O.
York Corrugating Co., Adams St. & WM RR., York, Pa.
York Ice Machinery Corp., Roosevelt Ave., York, Pa.
York Oil Burner Co., Inc., Jessop Place & P. R. R., York, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati, O.
Young Radiator Co., 709 Marquette St., Racine, Wis.
Young Regulator Co., 4500 Euclid Ave., Cleveland, O.
●Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown, O.

Z

Zapon-Brevolite Div. Atlas Powder Co., North Chicago, Ill.
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J.
Zenith Electric Company, 607 S. Dearborn St., Chicago, Ill.
Zink Co., John, 4401 S. Peoria St., Tulsa, Okla.
Zobell Electric Motor Corp., Garwood, N. J.
Zonolite Co., 5905 Second Blvd., Detroit, Mich.

● Advertisement in this issue. See Index to Advertisers, page 206

MERCOID
HIGH
LOW
TO ADJUST HIGH OR LOW POINTER, PRESS BACK AND MOVE
LEFT HAND POINTER INDICATES HIGH TEMPERATURE OPERATING POINT
RIGHT HAND POINTER INDICATES LOW TEMPERATURE OPERATING POINT
SWITCH

Warm Air Furnace and Blower Control

SENSATHERM
The Thermostat of Beauty and Mechanical Perfection

YOU CAN'T GO WRONG WITH

MERCOID CONTROLS

They are first choice of the discriminating trade · · · ask the man who knows. ★ When you specify Mercoid Controls, you get the most modern precision instruments used in the heating and air conditioning field. ★ They are not only accurate, but built to give years of dependable service without needing any attention. ★ They require no oiling. ★ The two-wire hook-up simplifies installation. ★ Mercury switches are used exclusively—they definitely eliminate all contact trouble. ★ Write for catalog giving complete information.

THE MERCOID CORPORATION
4201 BELMONT AVE. ★ CHICAGO, ILL.

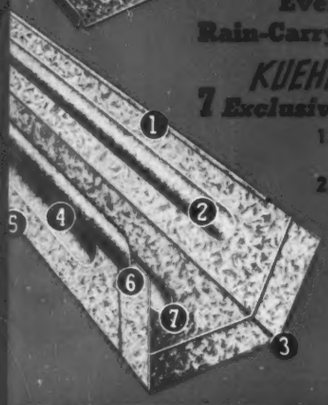
It pays you to "go MILCOR" for bigger sheet metal profits

Units of the Complete MILCOR Line of Metal Roofing

1. "Perfect-Lap Twodrain" Channel Roofing.
2. 5-V Crimp Roofing.
3. 3-V Crimp Roofing.
4. 2-V Crimp Roofing.
5. 1¼" Corrugated Non-Syphoning Roofing.
6. 2¼" Corrugated Roofing.
7. Pressed Standing Seam Roofing.

Everything you need in Rain-Carrying Equipment headed by KUEHN'S SQUARE GUTTER

7 Exclusive Construction Features

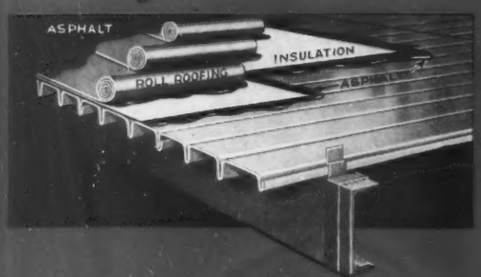


1. Hemmed here for strength and easy handling.
2. Decorative Flute adds strength.
3. Perfect Formation of shape.
4. Fluting on Outer Side reinforces and beautifies.
5. Precision Manufacture makes trough straight and true.
6. Outer Bead has stiffening tongue.
7. Decorative and Reinforcing Flute on bottom.

MILCOR'S dependable quality backs up all your claims . . . brings you repeat business . . . Prompt service from quick-delivery points . . .

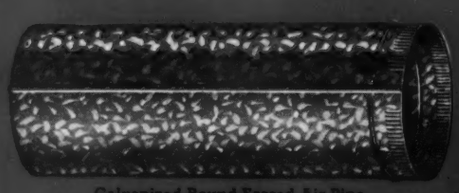
Wide line of sheet metal products that helps you *make money* . . . so great a range of individual products, types, weights, metals, etc., that you can meet the demands of all customers with the *right* item . . . and give them good-looking, safe, satisfactory jobs that make them willing to recommend your work to others . . . Constant improvement in design, materials, workmanship, and methods of production has marked Milcor's progress, until today Milcor products are accepted nationally as standards of quality . . . products that give you something to sell besides price, to help you win out in competitive selling . . . Conveniently located plants and warehouses carry ready-to-ship stocks . . . Join the many sheet metal men who are enjoying more work and bigger profits . . . Recommend and use Milcor products wherever you can on sheet metal jobs . . . Write today for free, colorful literature on the Milcor sheet metal lines . . . *Milcor Steel Company, Milwaukee, Wisconsin.*

G-55

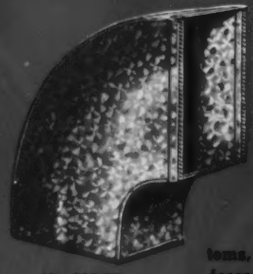


MILCOR Steel Roof Deck makes the deck job *your* job on *many types of buildings*

Adaptability to any type of building construction brings plenty of jobs to your shop. Light weight . . . easy to handle . . . easily attached to any structural member. Unique offset enables you to nest sections so easily, every job's a fast-running job—and a profitable one.



Galvanized Round Forced Air Pipe



No. 515 Elbow

Related system of Forced Air Units meets almost every condition

The Milcor Forced Air Line is a complete "family" of products that help you meet almost every condition in air conditioning plants, trunk line systems, other types of installations using forced air.

Modern Series Pattern — Spanish Texture Pattern

MILCOR Metal Ceilings provide [illegible] season indoor work that brings [illegible] extra profits

Go on fast, right over old ceiling — plaster or [illegible] other type. Wide selection of popular ceiling patterns to fit definite architectural requirements — and [illegible] plete line of metal cornices, moldings, borders. [illegible] Buildings of all types offer you opportunities [illegible] these money-making jobs.